nitrogen consists of two volumes of nitrogen and one volume of oxygen condensed to two volumes, this solution would contain oxygen equivalent to half a volume in one volume of water. Such a solution has a sweet, slightly insipid taste, and is somewhat more agreeable to drink than pure water; it confers its flavour in a marked manner on wine, or other liquid with which it may be mixed. A stronger solution may be made under pressure, and this of course possesses a more strongly-developed taste.

The principal object of M. Limousin's paper is to show that a solution of protoxide of nitrogen, such as described above, may be considered as an extraordinary agent, capable of acting as such when introduced into the animal economy, and therefore calculated to be useful in medicine otherwise than as an anæsthetic agent. With this object, the author instituted some experiments to demonstrate the ease with which protoxide of nitrogen may be decomposed. These showed that the union between the nitrogen and oxygen was so feeble as not to remove it in a great measure from air as an oxidising agent at ordinary temperatures. Certain physiological experiments led the author to believe, that at all events, within a certain limit, protoxide of nitrogen was also decomposed in the animal economy, and could therefore act as an oxidising agent; these were made with venous blood. Other experiments were made on the anæsthetic action of gaseous protoxide of nitrogen on various animals. The author concludes from his experiments that solution of protoxide of nitrogen would probably act physiologically, in virtue both of its anæsthetic and stimulant properties and of its oxidising powers. In order to test the extent to which the solution of protoxide of nitrogen may be used, the author himself drank it to the amount of two bottles a day, both in the pure state and mixed with wine. The only effects were a slight excitement, and a sensation of heat in the head somewhat marked, having some analogies to the phenomena of alcoholic intoxication.

The author concludes his paper by drawing attention to the properties conferred on sulphuric ether when saturated with protoxide of nitrogen. A quantity of ether being exposed to a cold of 12° C., was made to absorb eight times its volume of the gas. The greater rapidity with which the solution evaporated, and the proportionate increase of the cold produced in comparison with pure ether, favours the supposition that the former would prove a much more energetic agent in producing local anæsthesia than the latter. A mixture of alcohol of 90 per cent., and ether saturated with protoxide of nitrogen being introduced on a little cotton wool into the cavity of a decayed tooth, will instantly relieve the pain.

ADULTERATION OF SULPHURIC ACID.

The *Moniteur Scientifique* has discovered that the English manufacturers occasionally adulterate sulphuric acid with sulphate of soda. This is supposed to be due to the fact that there is a sensible difference in the price of acid at 60° Beaumé, and that at 66°. Inasmuch as the acid may be concentrated in leaden vessels until it marks the first strength, and as platinum is necessary for continuing the operation, the extra cost of the latter may be saved by increasing the specific gravity by means of sulphate of soda in place of the process of concentration.

PREPARATIONS OF ANILINE REDS WITHOUT ARSENIC.

M. Z. Roussin, in a communication to the *Journal de Pharmacie et de Chimie*, draws attention to the fact that arsenic acid now replaces all other reagents which have been employed in producing the aniline reds from commercial aniline. Alluding to the great danger to which the workmen are exposed by this method of manufacture, M. Roussin draws attention to the immense extent to which this substance has been used as a colouring agent, and to the variety of the applications which it has received in that character. We may demonstrate this by extracting a few from an avowedly incomplete catalogue enumerating twenty-four different applications of this colouring agent:—

Colouring of paper,
Dyeing stuffs,
Dyeing straw,
Dyeing furniture,
Colouring confectionery,
Toilet pomades, etc.,
In the manufacture of artificial flowers, etc., etc.

In consideration of the imminent dangers to which the public are exposed by so extended a dissemination of a poison like arsenic, it had become a matter of very great importance that arsenic should disappear from the manufacture of the aniline colours. M. Roussin therefore calls attention to the fact that M. Coupier has ultimately succeeded in resolving this problem. A report on the processes employed by M. Coupier will be found in the *Bulletin de la Société Industrielle de Mulhouse*, from which the following extracts will show that arsenic acid may be henceforth forbidden in the manufacture of the aniline reds:—

"M. Coupier produces a red by the reaction, at a suitable temperature, of a mixture of pure aniline, nitrotoluene, hydrochloric acid, and small quantities of metallic iron. Ordinary commercial aniline (a mixture of aniline and toluidine), and nitrobenzol (a mixture of nitrobezine and nitrotoluene), may also be used in concurrence with hydrochloric acid and metallic iron. In either case the red produced is identical with ordinary aniline red; its base being rosaniline. . . . The red is formed equally well when operating with the small quantity of 200 grammes, or when, on the large scale, 100 kilogrammes are worked at a time. . . . The quantity of red obtained is at least equal, if not superior, to that obtained with arsenic acid."

Pharmaceutical Society of Great Britain.

*Meeting of the Council, June 2, 1869,**

Mr. Sandford in the Chair.

Present—Messrs. Abraham, Bottle, Bourdas, Brady, Carteighe, Deane, Dymond, Edwards, Evans, Haselden, Hills, Ince, Mackay, Morson, Orridge, Savage, Squire, Stoddart, and Williams.

This being the first meeting after the Anniversary, and the minutes having been read and confirmed, the following were elected officers of the Society for the ensuing year:—

Henry Sugden Evans . . .	President.
Adolphus Frederick Haselden .	Vice-President.
Thomas Hyde Hills . . .	Treasurer.

Mr. Sandford then vacated the chair, and the President and Vice-President took their respective seats.

Moved by Mr. Deane, seconded by Mr. Orridge, resolved unanimously—"That this Council desire to place on record their high appreciation of the manner in which the office of President to the Society has been discharged by George Webb Sandford, Esq., during the last six years, and their sense of the debt of gratitude which is due to that gentleman from every person interested in the art of pharmacy for his laborious, persevering, and successful exertions.

"Whilst cordially congratulating Mr. Sandford upon that success, and testifying their acknowledgments for his important services, they wish to add their earnest hope that he

* From the *Pharmaceutical Journal*.

may be long spared to enjoy health and prosperity, and to labour in the cause of the Pharmaceutical Society."

Elias Bremridge was re-appointed Secretary and Registrar. Richard Bremridge was re-appointed Assistant-Secretary.

The following committees were appointed:—

General.—Messrs. Bourdas, Carteighe, Deane, Edwards, Ince, Morson, Orridge, Sandford, Savage, Squire, and Williams.

Finance and House.—Messrs. Bourdas, Carteighe, Orridge, and Williams.

Library, Museum, and Laboratory.—Messrs. Bourdas, Carteighe, Deane, Edwards, Hills, Ince, Morson, Sandford, Squire, and Williams.

Benevolent Fund.—Messrs. Bourdas, Carteighe, Hills, Orridge, Sandford, and Williams.

Parliamentary.—Messrs. Bourdas, Carteighe, Edwards, Hills, Morson, Orridge, Randall, Sandford, Squire, and Williams, with power to add to their number.

The following fourteen pharmaceutical chemists were nominated as examiners for England and Wales:—Bird, Augustus, London; Carteighe, Michael, London; Cracknell, Charles, London; Darby, Stephen, London; Davenport, John T., London; Deane, Henry, Clapham; Edwards, George, Dartford; Gale, Samuel, London; Garle, John, Bickley, Kent; Hanbury, Daniel, London; Ince, Joseph, Knightsbridge; Morson, Thomas N. R., London; Southall, William, Birmingham; Squire, Peter, London.

On the motion of Mr. Carteighe, seconded by Mr. Savage, that a ballot be taken for the appointment of the Board of Examiners, the following twelve were elected and appointed:—Bird, Augustus; Carteighe, Michael; Cracknell, Charles; Darby, Stephen; Davenport, John T.; Deane, Henry; Edwards, George; Gale, Samuel; Garle, John; Hanbury, Daniel; Ince, Joseph; Southall, William.

The following pharmaceutical chemists were appointed examiners for Scotland for the ensuing year:—Messrs. Ainslie, Aitken, D. R. Brown, Buchanan, Kemp, Mackay, and Young.

The President and Vice-President are on all committees, *ex officio*, and on the respective Boards of Examiners in London and Edinburgh.

In accordance with the Bye-laws, Section 10, Clause 9, the Secretary was instructed to submit the names of the Examiners now appointed for England and Wales, and the Examiners appointed for Scotland, to the Privy Council for approval.

Moved by Mr. Brady, seconded by Mr. Edwards, and resolved,—"That the travelling expenses of any Country Members, elected to the Board of Examiners, be defrayed by the Society, in the same way as those of Country Members of the Council."

Moved by Mr. Mackay, seconded by Mr. Orridge, resolved,—"That the list of Local Secretaries for the ensuing year now presented be approved; that the Secretary be requested to communicate with them accordingly, and to publish their names in the ensuing number of the *Journal*."

In reference to the following resolution, passed at the late Annual General Meeting:—

"That as a result of the Pharmacy Act of 1868, it is desirable that the Minutes and Votes of future Meetings of Council be published monthly,"

It was moved by Mr. Hills, seconded by Mr. Morson, resolved,—"That the publication of the proceedings of the Council, from month to month, be entrusted to a committee, consisting of the President, Vice-President, and Mr. Sandford."

Moved by Mr. Williams, seconded by Mr. Brady,

"1. That with a view to carry out the principle of the Resolution, passed at the April Council Meeting, by placing the future management of the Journal in the hands of one responsible Editor, the Secretary be instructed to advertise in the *Times*, *Athenæum*, and *Chemical News*, inviting applications from gentlemen desiring to hold the office.

"2. That the salary of the Editor be £250 per annum.

"3. That Mr. Barnard be requested to accept the appointment of Sub-Editor at a salary of £100 per annum, and that he be authorised to carry on the Journal on his own responsibility until the appointment of the Editor."

The following Amendment was moved by Mr. Sandford, seconded by Mr. Mackay:—

"That Dr. Redwood be appointed Editor of the *Pharmaceutical Journal* for the ensuing year, with a stipend of £250 per annum, and that Mr. John Barnard be appointed Sub-Editor with a salary of £100 per annum."

The Amendment having been put, and the votes taken

For the Amendment—Abraham, John; Deane, Henry; Edwards, George; Evans, H. Sugden; Haselden, Adolphus F.; Hills, Thomas Hyde; Mackay, John; Morson, Thomas N. R.; Orridge, Benjamin B.; Sandford, George Webb.

Against—Bottle, Alexander; Bourdas, Isaiah; Brady, Henry B.; Carteighe, Michael; Dymond, George; Ince, Joseph; Savage, William Dawson; Squire, Peter; Stoddart, William Walter; Williams, John.

The numbers being equal (ten), the Chairman gave his casting vote in favour of the Amendment, which, having been put as a substantive motion, was carried.

Moved by Mr. Brady, seconded by Mr. Edwards, resolved,—"That an Address be delivered to the Students at the distribution of prizes and opening of the Session in October next. That Mr. Deane be requested to give the Address, and that ladies be admitted as on the last occasion."

The Regulations of the Board of Examiners, *vide* page 17, were confirmed and adopted.

[Three pharmaceutical chemists were elected members.

Twenty gentlemen having passed their respective examinations, were elected Associates of the Society.

Fifty-five registered chemists and druggists were elected members.]

BENEVOLENT FUND.

On the report and recommendation of the Benevolent Fund Committee, the following grants were made:—

The sum of ten pounds to a late member residing in London.

The sum of twenty pounds to the widow of a late member in Flintshire.

The sum of ten pounds to the widow of a late member at Leominster, and her name was placed on the list of candidates for an annuity.

Other applications for relief were deferred for further inquiry and consideration.

The Council having considered and determined as to the expediency (financially) of electing pensioners in October next,—

Resolved,—"That the Secretary be requested to announce in the usual channels that the Council will be prepared to grant two annuities of thirty pounds each in October next."

THE MEDICAL COUNCIL AND THE MEDICAL ACTS.

THE following Memorial has been drawn up for presentation to the General Medical Council, with the view of urging the necessity of an Act of Parliament to amend the Medical Act of 1858, and the Amendment Acts subsequently passed:—

"The Act of 1858 affirms that 'it is expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners.' The experience of the past ten years has proved that the Act is practically inoperative as a guide to the public in distinguishing legally qualified members of the medical profession. A large number of men are practising medicine and surgery in different parts of the country, not only without any legal qualification, but without having undergone any regular course of medical education. In some places, men are practising under fictitious names, assuming the title of doctor, and obtaining considerable sums of money from weak persons, by intimidation and extortion. The Medical Act of 1858 is practically inoperative in restraining these offenders.

"It is capable of proof that some legally qualified men have lent their names to persons without qualification, to enable them to practise medicine and surgery without incurring liability to prosecution. Such a proceeding is regarded as a fraud on the public and the profession; and it is suggested that in any future Bill greater powers be given to the General Medical Council to remove from the register, and deprive of their professional rights, qualified men who shall aid and abet illegal practitioners.

"The present state of the law touching certificates of death, greatly favours the successful practice of secret poisoning and infanticide. It is suggested that the certificate of a legally qualified member of the medical profession, in the absence of a coroner's order, shall be indispensable as a preliminary to every burial.

"The Medical Act of 1858 purports to constitute the General Medical Council for the purpose of regulating medical education and registration throughout the United Kingdom; but composed as the Council is, mainly, of the members of the medical corporations who grant licences to practise, the control of the system of medical education has proved to be very imperfect.

"The undersigned are of opinion that the system of medical education should be revised, so as to insure the possession of a thoroughly scientific and practical acquaintance of medicine and surgery, on the part of persons applying for the legal qualification.

"To this end, it is held to be necessary to substitute for the present system of examination, and for the many forms of licence to practice now granted, one high and uniform standard of examination, and one legal qualification.

"The practical part of the course of professional study stands in special need of improvement, and the undersigned would gladly see the regulations more stringent, to insure the attendance of students on a thorough course of practical study in hospitals; but in the event of any student engaging in private practice on his own responsibility before he is legally qualified, it is suggested that he forfeit the loss of the year, or years, as a student during which he has so practised.

"It is respectfully, but very earnestly, submitted, that the influence and power for good, of the General Medical Council would be greatly extended, with the profession and the public, if provision were made in a new Act of Parliament for the representation on the Council of the general body of practitioners of medicine and surgery, who are now, for the most part, deprived of any professional franchise.

"In any future Act of Parliament, it is suggested that provision be made for instituting prosecutions under it by a public prosecutor or other public functionary, on behalf of the General Medical Council, instead of leaving the voluntary enforcement of the law to individuals.

"The undersigned desire to obtain no privileges for the profession, without giving the public commensurate advantages, and they submit that an Act of Parliament so framed as to raise the standard of professional efficiency, to protect life, and prevent the obtaining of money on false pretences, is an Act as much needed in the general interest of the community, as for the welfare and honour of the medical profession."

The printed copy of the memorial has appended to it above 200 signatures, 90 of which are those of members of the profession in Birmingham, whence the document has emanated.

THE COUNCIL.

LETTER FROM A LONDON PHARMACIST TO ONE RESIDENT IN THE COUNTRY.

MANY thanks, my dear friend, for your long and interesting letter on the subject of vulgarising the Council by publicity. I should the sooner have replied, but there was a difficulty in gaining exact information as to what a certain member of Council is reported to have said. At last, I am in a position to give you the very words. He remarked, that it would be a good idea for the Council to go round the provinces in a caravan, when they might be carefully inspected, and that if our indefatigable Secretary practised a little on the big drum, that might prove an additional attraction. Subsequently, he stated it was his individual opinion that the scheme should have hailed from Colney Hatch. But this must be taken with a grain of salt, for he is occasionally eccentric, and his views are invariably home-made.

There are some things connected with the general question I never could understand. Some northern lights are loud in lamentation over the constant re-election of a few well-known names—the list might be almost stereotyped. New blood is the one thing needful, and that essential must be introduced, even though by means of a sensational circular, which appeared one month too late to be of the smallest use. What can prevent energetic voters from doing precisely what they wish? The country chooses the representatives of English Pharmacy, not London, which is numerically powerless. Why not *act*, instead of singing Jeremiads? and what hinders, but that the electors should sweep away the entire Council, should that be their wish, saving only the remnant that should be spared by lot? True, there is this objection, that were the Society's affairs intrusted solely to new administrators, due recognition of past services would be denied to those called its founders, and some of its future prospects might be seriously imperilled. But, granted that the metropolis exhibits annually the same list of names, the country follows suit, and is not less limited in its selection. Let us both reform, and nominate candidates of acknowledged excellence from our own surroundings.

Pondering these things, I thought I would invite our London member to talk the matter over. At my request he came, and this is what he said:—

"The dream of publicity was initiated by a gentle man fond of bold experiment. With him is associated a nebulous pharmacist of great personal influence, but whom it would much advantage were he, for a short period, to live and move and have his being amongst practical working men. The idea seems to be, that a regularly reported Council would insure intelligent voting; we should know something about the men, and whether they had proved equal to their task. This starts with total ignorance of one fact—that Council transactions are, to about one-half, only the formal confirmation of Committee work—plodding, continuous, conscientious labour, which never can find a record in any

printed statement. Our best Committee-men are sometimes our least attractive speakers; having 'gifts differing,' public display is that from which they shrink, and for which they are least adapted. It will happen often that the names of the mover and seconder of a motion are in a measure accidental, and that their presence conveys not a shadow of personal information to the reader. The report, therefore, is doubly false, or rather misleads in a twofold manner. A man is credited for that with which he is but casually connected, while that at which he has slaved for months is absolutely ignored. Moreover, I cannot see the possible value of having votes registered on a division, without the further statement of the motives on which they are based; while a mass of circumstances, though to the last point necessary in themselves, possess no general interest. Fancy the forlorn reporter, seeking in vain, out of most unpromising materials, to write neat paragraphs for the public press. Think, also, what a galling thing, for one of my sensitive disposition, to know that a miserable object was dogging my lightest words, noting down unstudied utterances, and presenting me before a public, for which I have an infinite respect, in a manner to which I am constitutionally repugnant. There glooms already in the distance the day when full publicity will be attempted. Then trivialities will assume importance, our journals will be crammed with useless matter, our freedom of action and independence slain, and, to some of us, a seat in Council will no longer be an object of ambition."

Here my friend looked mournful, and he said, as he went away:—"The reason I held up one hand against the innovation was, that it was not legal to hold up two. I cannot trim my sail to every wind that blows; and if, for the sake of popularity or place, or induced by fear, I failed to give a reason for the faith within me, I should be unworthy of that mark of trust which, to my unfeigned surprise, I have recently received."

Ever yours,

A London Pharmacist.

[We print the above communication with some reluctance, not because we fear to promulgate opinions directly opposed to those which we maintain, but because we believe that the clever writer is intrenching a false position, which he must abandon sooner or later. The Council was vulgarised by Act of Parliament last year, and, like the British Parliament, the Medical Council, and other vulgar bodies, its palladium is publicity. It remains to be seen whether the members of the Society will be satisfied with the bare resolutions and division lists, or whether they will demand full publicity. We trust, however, that the self-consciousness of the London member will not be deemed an insuperable barrier to the legitimate extension of the principle which was so satisfactorily established at the anniversary meeting.—Ed. *C. and D.*]

POISONING BY PHOSPHORUS.—OIL OF TURPENTINE THE ANTIDOTE.

By Thos. E. Jenkins, M.D., of Louisville, Kentucky.*

POISONING by phosphorus has become as frequent of late days, as it was by means of arsenic in former times; indeed, the former has taken the place of the latter as the popular toxic agent at present. M. A. Tardieu informs us that in criminal statistics, phosphorus takes the first rank as the fashionable poison. This substitution of phosphorus for arsenic is doubtless brought about by the wide-spread use of chemical matches, and of phosphorus paste for the destruction of rats, mice, and other noxious vermin, and it is the more dangerous since up to this time no real antidote for this poison has been known.

In view of this state of things, M. Personne has made a number of experiments upon dogs, to discover, if possible, some agent with which to combat the deadly effect of this substance. Among other substances, he tried the oil of turpentine, and the sequel will show the success which has followed his trials. He made three series of experiments, using five healthy dogs in each.

The poison and the oil were introduced by means of a stomach-tube, and the dose of the former was from 1 to 3 decigrammes (1½ to 4½ grains) to each animal, given in the state of match-ends in some cases, and in the others the phosphorus was administered in solution in oil of sweet almonds emulsified by means of the yolk of egg. The poison was thus put into a condition most favourable for absorption, and for producing its toxic effect.

The oil of turpentine was employed in the dose of 10 grammes (154 grains) emulsified in like manner, and the experiments continued from the 13th of January to the 27th of February last.

The following results were obtained:—The dogs submitted to the action of phosphorus alone all died; those to which the poison was given and its injection followed in from one to two hours by the antidote, showed the same symptoms as those above mentioned, and some were very sick; one only succumbed; the four survivors recovered perfect health, and were kept from ten to fifteen days, to watch if anything untoward would supervene. In series No. 3, the animals were given the poison, and immediately afterwards the antidote; one of these died; the four others suffered a slight indisposition only, and were kept up for ten days to a month, without presenting any alteration in their usual health.

All to which no antidote was given, died; and eight of the ten to which the turpentine was administered, suffered no serious inconvenience.

The deaths which took place in the second and third series occurred on the 22nd of January, when the temperature fell below freezing point, and the water to which the animals had access was congealed. This circumstance should not be lost sight of in attempting to account for the death of the two dogs which had taken the antidote. These dogs also were the ones subjected to the maximum dose of the poison with no increase in the dose of the antidote.

In explaining the action of the antidote in combating the toxic effects of the poison, the subject presents two points of the greatest interest. The first is the *modus operandi* of the poison and of the antidote; the second, the philosophical reasoning which doubtless led to the employment of the antidote.

Apart from the powerfully irritating action on the mucous lining of the stomach of the acid produced by the oxidation of the phosphorus while still lying unabsorbed in the cavity of that organ, this poison possesses an inherent deadly effect upon the blood itself, when taken into the circulation. Absorbed phosphorus kills by preventing proper hæmatosis; it engages the oxygen, and does not allow it to perform its usual functions of ærating the blood, of converting chyle and venous blood into the vitalized fluid. When this takes place rapidly, there is prompt death by asphyxia; when it occurs slowly, it gives rise to fatty degeneration, the result of faulty hæmatosis. The disposition and accumulation of fat in individuals using phosphorus in minute doses as a medicine, was some time ago announced as a fact. Then

* *Medical and Surgical Reporter* (Philadelphia).

the question whether the increased fatty deposits be a normal process or a pathological one, would be pertinent. If it be a fatty degeneration in the sense it is generally understood, may we not ascribe the apparent improvement frequently observed in emaciated patients after a course of the hypophosphites (easily oxidizable compounds), rather to the change of one pathological condition for another, or the superinduction of a new pathological state?

Now it has been long known that phosphorus, under ordinary circumstances, is slowly oxidized in the air, giving rise to a sensible increase of temperature, with perceptible evolution of light, especially when the action is observed in the dark. The phosphorus is also found to be covered with a film of acid, resulting from its oxidation. When, however, the atmosphere surrounding the phosphorus contains a minute proportion, the 1-4444 or more of its volume of the vapour of oil of turpentine, this slow oxidization is suspended until the surrounding temperature or the temperature of the phosphorus is by some means increased; then the amount of the vapour of turpentine must be greatly augmented to produce the same effect. The observations were made between 66° Fahr. and 200° Fahr., by Graham, of London, prior to 1850.

Oil of turpentine or its vapour would then serve to prevent the absorption of oxygen by the phosphorus in the blood, in a similar manner to that during the slow combustion at moderate temperatures in air, and thus the poison is stript of its property of depriving the blood of its essential, oxygen, and time is allowed for its elimination without causing serious disorder in the system.

It is here suggested that other bodies than the oil of turpentine may be employed as antidotes for phosphorus upon the same principle, for we know that at the ordinary temperature of 60° Fahr., and even at 150° Fahr., 1-150 of the vapour of ether, 1-450 of olefiant gas, and 1-1820 of the vapour of petroleum will produce the same effect as does the 1-4444 of the vapour of the oil of turpentine upon phosphorus in the atmosphere.

THE PATENT MEDICINE STAMP.

WE give below the substance of Mr. BRETON'S paper on the above subject, which, as we mentioned last month, was ruled out of order to be read as intended at the annual meeting of the Pharmaceutical Society. We cannot altogether coincide with the views of the writer—first, and chiefly, because we dissent from his primary assumption that the operation of the present system is particularly annoying or injurious to any of the parties concerned, Government dealers or public. Granting, as Mr. Breton does, that the sixty thousand pounds is to be collected from some source, we really cannot see a more ingenious distribution of the burden than we have at present. As a matter of fact, the bulk of the amount is now paid by the consumer, and paid, too, with something more than willingness, Her Majesty's stamp being popularly credited with a share in the excellence of the remedy. It would be generous, indeed, if chemists were to transfer this tax entirely to themselves, enjoying, at the same time, the doubtful satisfaction of irritating and disappointing their customers. So long as Mr. Lowe presides over the Exchequer, however, there is little prospect of the success of any scheme which, on paper, shows a diminution of £10,000 to the revenue.

"The Patent Medicine Stamp question is a vexed one, and the cause of much general annoyance to our profession. No other similarly constituted body is oppressed in a like manner. It is a fact, beyond dispute, that it often is a question—when shall the stamp be used, and when omitted? equally by ourselves and the authorities of Somerset House.

"This stamp was first imposed in the 52nd year of the reign of George III., and produced in the year ending 31st of March, 1868, £59,814, and to the State, with the liccnce to sell, the insignificant sum of £66,464, on quack medicines. This amount, or nearly so, can easily be raised by a re-arrangement; and in the course of my remarks, I will endeavour to show how this could be done. To arrive at this, the present stamp and licence duties should be abolished; and if by a re-arrangement the Exchequer will not suffer, we may be sure of the co-operation of the officials, who have already promised to meet us on this ground. They hold the opinion, with us, that its operations are annoying and irksome. No reasons can be adduced why this profession—the worst paid, always at the call of the public, and equally taxed with our neighbours—should have its productions and compounds, the result of much labour, STAMPED, when other trades are free from such imposts. The grocer, whose produce is not of his own hand, is permitted to advertise his "teas" as being delicate and deliciously refreshing, his "chocolates" invigorating, and his "coffees" as delightful stimulants; but a box of rhubarb pills may not be styled a digestive or a paregoric mixture, a cure for coughs and colds, without a *stamp*. I may appear to you a radical in my liberalism. Be that as it may, I only want free trade in physic. Sell what you choose, I do not wish to interfere; I do not stand here as your Chancellor of Exchequer, or that of Her Majesty's revenue; my aim is to induce you to act in concert for our benefit collectively.

"I now beg to advance—

"First. That every person who shall make a medicine, either for internal or external use, affecting the human body, and having a printed label thereon, shall for such medicine or medicines obtain a certificate before he can prepare, from our or one of the other learned institutions competent to grant, and on the production of this certificate alone shall the Excise be empowered to grant a licence to the manufacturer; and for this licence, I propose that the sum of one guinea shall be charged. And, further, to place the small manufacturer on the same footing as the large, I propose an additional sum of five per cent. on all goods over and above the first £200 retail value; and the returns shall be made on the 31st of March in each year; and in the absence of this, the Excise can surcharge, as in other taxes. By the compulsory use of this certificate, I maintain that we shall secure the manufacturing of medicines, and their sale to the public, by qualified and certificated persons, and thereby prevent the hawking of quack nostrums throughout the country. This practice is too familiar to my fellow-members to need a long discussion. This would likewise prevent the exhibitions one often sees at markets and fairs in the country and in the suburban districts of London, of hideous pictures illustrating the action of their vile drugs. I propose the penalty for infringing the certificate should be £20; the Pharmaceutical Society to be compelled to prosecute on the evidence of sworn witnesses.

"Secondly. I propose to abolish all distinction between town, country, and London, in the price of the licences, and make one uniform price, for all who shall keep medicines for public sale, either prepared by themselves or others, having a printed label thereon, must obtain a certificate before a person can keep or offer a medicine for sale. This certificate to cost one guinea.

"Thirdly. All persons who shall sell patent medicines wholesale, not of their own manufacture, shall, in addition to the manufacturers' licence (if they make) or the retailer's (if they retail), obtain a licence of ten guineas.

"Fourthly. This division requires serious consideration. It has become a national evil, and ought, like the cattle plague, to be exterminated—I mean the wholesale introduction of what are styled Patent Medicines. As free trade must exist in physic as in other things, I propose to place the foreign manufacturer on the same footing as ourselves. He must pay the manufacturer's licence, also the retail, if he has a depôt in this country, and the wholesale licence must be paid, whether the depôt is separate or connected with another establishment; and these separate licences are to apply to every distinct patent. Manufacturers of one or more will be considered as one; and the depôt where a foreign patent is purchased shall be considered the depôt of the importer, till the contrary be proved.

"I have endeavoured to point out each class of patents which come under our notice, and will now give you my estimate of the amount to be obtained from the various licences:—

1. The manufacturers'	£12,200
2. Five per cent. . . . . :	5,000
3. The retail chemists'	13,000
4. The retail dealers' (not chemists') .	10,000
5. The wholesale dealers' . . .	10,000
6. The foreign patents	5,000
	£56,000

"In the foregoing observations, I have attempted to place before you my reasons in full; still I fear that I have not done justice to the subject, which, I trust, will be ably discussed."

A CHEMIST'S VIEW OF THE SEWAGE QUESTION.

Read before the Glasgow Sewage Association, *March 30th*, 1868.*

OUR great object is to consider, first, how to carry away from our houses the excreta of our large population; and secondly, how to treat it so as to recover for our use its full fertilising value. The peculiar character of the material to be dealt with renders some vehicle necessary for its transport.

This vehicle may be either solid, liquid, or gaseous; and the secondary proposition depends so entirely upon the vehicle employed for the first, that I intend briefly to review these three several means of conveyance in their chemical aspect. To avoid complication in speaking of either, I shall assume its general adoption.

Of solid vehicles, the cheapest being earth, of liquids water, and of gases air; I shall speak of the three different methods as water, earth, and air carriage, taking water first, as being now most common.

I wish to premise, however, that I regard both the above propositions as essential and necessary; and take as my text Mr. F. O. Ward's celebrated formula—"the rainfall to the river, and the sewage to the soil,"—no system of sewerage is worthy our consideration which does not give back to the soil that which in our food we have taken from it; and I consider the mere ridding ourselves of a valuable fertiliser, simply on account of difficulty in dealing with it, quite beneath the enlightened spirit of our age.

For convenience of calculation, I take the population of Glasgow at 500,000, and the value of the excreta at 8s. 4d. per head per annum, or £208,333. This is the value given by Professor Way and Mr. Lawes (the highest authorities on this subject), in the third report of the Sewage Commission, and it is now generally adopted by all chemists, each person being reckoned as contributing the value of 12½ lbs. of ammonia per annum.

The total bulk of excreta, making allowance for loss, is estimated at 10 cubic feet per head per annum, and its weight 630 lbs., making an annual total of 5,000,000 cubic feet, weighing 140,625 tons; or, per day, 13,698 cubic feet, or 385 tons.

This, then, is what Glasgow has to remove. The value is 10d. per cubic foot, or 29s. 6d. per ton, and equal (Professor Way) to 16,666 tons of Peruvian guano annually. Of this amount the solids form 1-10th, and the liquids 9-10ths; or 1 cubic foot per head per annum solid, and 9 cubic feet of liquid. The solid and liquid excreta have a relative chemical value of 1 to 6, or 1s. 2d. per head for the former, and 7s. 2d. per head for the latter. The total is thus divided:—

	Tons	s.	d.	£
Annual value of solid excreta ...	14,062 at	41	5 ...	29,161
„ „ liquid „ ...	126,563 „	28	3 ...	179,172
				£208,333
The value of the daily removal is	385 „	29	6 ...	£569

Let us now see how this is proposed to be removed, and what is to be gained in the process.

WATER CARRIAGE.

Taking the amount of water used per head at 5 cubic feet daily, and the rainfall the same, we have the 10 cubic feet diluted with 3,650 of water, and the annual material to be removed increased from 500,000,000 cubic feet to 1,825,000,000 cubic feet, or 140,625 tons increased to 50,920,401 tons; in other words, we require daily to pump away 140,000 tons of sewage to remove 385 tons of excreta, of which only 38½ tons is solid matter! No wonder we are called upon for lavish expenditure to carry off such a quantity as this, for even if no pumping were required, the cost of sewage must be enormous. And then does it carry it away?—and does it utilise it? Suppose an elaborate system of intercepting sewers to convey our sewage to some point several miles down the river; would that meet the evil? Let the experience of London answer this. The metropolitan sewage works are the greatest effort of this kind, and, from the difficulties overcome, are a perfect triumph of engineering skill, reflecting the highest honour on Mr. Bazalgette; but they cost the princely sum of £4,250,000, or £180,262 per annum, the cost to be paid off in forty years by rating, at the end of which period the Thames will probably be closed as a port by their deposit, the sewer gases will have proved themselves the most deadly of enemies, and London will stand on a substratum of soil loaded with sewage from infiltration and leakage.

To show that these are not improbable speculations, I append an extract from an able article in the *Pall Mall Gazette* of February 26th, 1868, entitled "The Sanitary Dead-Lock":—

"It has now been decided that although Parliament has conferred the right of drainage into the sea and public rivers, this right can only be exercised subject to the condition that no other nuisance is thereby created. 'The notion of collecting all the sewage of a large town,' says Vice-Chancellor Wood, in the case of Blackburn, 'and pouring it into a river without the slightest attempt to clear it of any of its grossest materials, is simply monstrous.' And, again, in the Attorney-General *v.* Birmingham Town Council, the court went as far as to declare that it would not balance the convenience of a town against the legal rights of an individual complaint—the latter must be respected. . . . . The case of the

* Communicated by the author.

metropolis differs from that of the provincial towns, but has occasioned a similar sanitary dead-lock. The main-drainage system discharges the refuse of London into the Thames at Barking and Crossness, comparatively out of the way of population. Although there is, therefore, no sanitary objection to these works, except as regards the towns below London, such as Barking, North Woolwich, Woolwich, Greenwich, Erith, &c., a serious difficulty of another kind has arisen. The mass of matter daily washed down by the sewers of London is so great that, during the few years that have elapsed since the opening of the new sewers, an enormous concentrated deposit of mud, street sweepings, and sewage refuse has accumulated in the bed of the river at Barking and Crossness, and now obstructs the navigation of the river. Last November Mr. Cave stated in the House of Commons that a ship had already stranded on one of the banks thus formed. A chart of the bed of the river at Barking, which has recently been prepared, shows that in the very centre of the channel the soundings have diminished at low water from 21 to 10 feet. . . . . Whatever may be the legal aspect of the question, it is quite evident that the navigation of the Thames cannot be allowed to be obstructed even for the sake of draining the metropolis, and that legislative interference will be required if the existing Acts are at all doubtful on this point. Indeed, the whole subject demands the careful consideration of Parliament, in order to release the municipal authorities throughout England from the embarrassing position in which they are now placed. Some way must be discovered of draining our towns at a less sacrifice than is involved in the pollution of streams and blocking up of navigable rivers."

And as to the sewer gases, it appears, according to the evidence collected by the sewage commission, quite impossible to get rid of them; one of the engineers examined making this terribly suggestive answer:—"I am afraid we must let out the stink in the middle of the streets."

Now stink is not the word, for sewer gases are gases of decomposition, and carry malaria, pestilence, and death with them. Dr. Fergus has related one of many instances in which a number of houses at Leith, previously healthy, have been affected at once with gastric (or typhoid) fever, when connected with the sewers; and, showing the constant infiltration of sewage into the soil, and thence into wells, he has also pointed out cases of gastric fever where the long unsuspected cause was the drinking of the water so contaminated.

Mr. Bazalgette states, that to ventilate the London sewers by air would cost £460,000 in plant, and £201,480 annually for fuel alone, exclusive of labour and other expenses; he also states that to flush them with water would cost £383,250 annually, even if the water-works could supply the quantity, which is out of the question. The water-closet system is also open to great objection—the best constructed closet is seldom perfectly free from odour; the back rush of deadly gases up the sewers when a high tide covers them, or a strong gale blows into their outlets at low tide, is of enormous force, and will rise through any closet, however well trapped.

Water is a mere carrier, and no disinfectant; its cost, also, from the great quantity required, is very considerable. Mr. Smith has stated the cost here at £40,000 per annum, and, no doubt, if general, £50,000 at least would be required to provide the water and keep up the closets.

The whole system of sewerage by water carriage is recklessly extravagant; it carries the solid and liquid excreta down to our neighbours to rot at their doors, and it leaves us a legacy of deadly gases to remind us that our endeavour to cheat nature has signally failed. As applied to even ridding ourselves of the nuisance, it is the finest effort of "the circumlocution office," and the best illustration of "how not to do it," in our generation.

Engineers have employed an elephant to do the work of a mouse, and the burly brute has trodden down and laid waste the country.

Then, as to its utilisation; here the system almost entirely breaks down. Notwithstanding numerous attempts, no portable manure ever has been, or ever will be, made out of sewage. The chemical value of average sewage, if it could be extracted, is 1d. per ton, taken at 4 grains ammonia to the gallon; this value is deduced from 93 analyses of Rugby sewage by Professor Way, and now generally admitted. One thousand tons are equal to 12 cwts. Peruvian guano.

Much has been said here about the solid matter deposited from sewage by standing; let it be clearly understood that it is almost valueless. At Birmingham it accumulates in large quantity, and cannot be sold at 6d. per ton. The reason of this is obvious; almost the entire manurial constituents are soluble in water; and no wonder all companies looking amongst the deposit for their dividends have failed to find them. They are exactly in the position of a ferret, watching patiently one end of a rat hole while the rat has escaped by the other.

The report of the sewage commission gives abundant evidence that even sewage irrigation only pays in certain favourable circumstances. This report is full of information, and represents an enormous amount of labour by its learned authors. They have worked hard to pick out the grain of wheat from the sack of chaff; but we must all admit that it would have saved them much trouble if we had never allowed the admixture.

Irrigation, the only method of utilising sewage, puts an amount of money value on the ground out of all proportion to the return obtained by the ratepayers. There appears no doubt that the farmer will not give ½d. per ton for it, delivered free of expense. Where gravitation and open carriers can be employed without pumping, its application is remunerative; but in no case is anything like the full money value obtained to the ratepayer. The cost of transport, where the chemical value of a product is only 1d. per ton, is far the more important item.

According to Professor Way's estimate, Glasgow would require 10,000 acres, constantly in use, at 5,000 tons sewage per acre per annum, and it would really require 15,000 acres, as one-third must be under root crop.

Now, in a damp climate like ours, what land would take this extra amount of water? and what farmer would ever dream of top-dressing his grass with manure equal to 3 tons of Peruvian guano per acre, if he had to pay the full market value for the manure? Moreover, what could be done with the grass where, as in our case, it would be impossible to make it into hay?

This system of sewage by water carriage, is, however, now so general, that any means of modifying its evils may be worth our notice.

The sewer traps should all be provided with sieves of charcoal; and I propose to avoid the unsuspected dangers of the sewer gases rising in our present water-closets, to employ a double sieve of wire gauze, containing charcoal, which will slide in just under the seat, and completely close the opening, and which, by a little mechanism, can be made to slide back automatically. Or to enclose the charcoal in a small box with wire gauze sides, and simply place it in the closet. I employ, by preference, seaweed charcoal, the use of which I propose also for the filtration of town sewage, before it is allowed to pass into rivers. It is singularly allied to animal charcoal, which it excels

in its porosity, its high oxidising power, and in the ease with which it admits the rapid passage of thick liquids. The thickest sewage passes through perfectly odourless and colourless. It entirely removes the organic matter from ordinary sewage, and can be used for a considerable length of time, without change. To gain its full power, the sewage should be run into large tanks, which can be used alternately, and allowed to deposit for 24 hours. The filtration should be upwards, through a stratum of char, and, when the deposit rises to the char, the whole should be mixed together, and made into manure; the char mixed with the sludge would render it more easy of transport. I do not intend to imply that the char removes the manurial value of the sewage to any great extent, but it renders it innocuous.

EARTH CARRIAGE.

This subject has been already brought before you; but as its chemical aspect has not been treated, I shall briefly allude to it. Some misconception appears to have prevailed here as to the disinfecting power of dry earth and ashes; both are absorbents of moisture, and to this extent, and no further, are these disinfectants. This may be easily proved by filtering putrid urine through either of these media; it passes unchanged.

These materials are only, therefore, deodorisers when largely in excess of the fœcal matter to which they are added.

Thus to take dry clay, the best substance of the kind, it would require three and a half times as much as the excreta, or 17,500,000 cubic feet to be brought into the city, and 22,500,000 cubic feet to be taken out again; and the actual value of this product would be £208,333, or 2¼d. per cubic foot, or 6s. 7d. per ton. Its practical value would, however, be much less, because, on account of the expensive carriage, the value of a manure decreases in inverse geometrical proportion to its strength. It stands to reason, therefore, that if a dry vehicle is to be resorted to, it must be more economical to use some substance which increases, rather than diminishes, the agricultural value of the product, especially if less of it can be employed to do the same work. That substance, which, while acting as a deodoriser, also absorbed the most water for a given weight, and added its value to the product, should, theoretically, be the best for this purpose. I find that, while perfectly dry clay only absorbs 45 per cent. of water, dry seaweed char absorbs 147 per cent., and the former becomes a sludgy mud, while the latter can be easily removed.

The use of an absorbent of this kind would, therefore, reduce the amount of material to be brought into the city to less than one-third, or to an amount equal to the excreta to be removed; or 5,000,000 cubic feet brought in, and 10,000,000 cubic feet taken out, annually, the daily removal being 385 tons in, and 770 tons out. This is not more than the present daily removal of ashes, while there would be no greater nuisance, and the value, exclusive of the value of the charcoal, would be about 15s. per ton. Viewed in this light, the dry closet system presents strong claims to notice, and, in a sanitary sense, its arrangements are perfect.

AIR CARRIAGE.

Carriage by atmospheric pressure possesses several advantages afforded by neither of the former systems, both of which add a large bulk of valueless but costly material to the excreta to be removed. Considering the great value, and easy application, of pneumatic pressure, it is remarkable that so little attention has been directed to it as a means of dealing with excreta; it has been entirely overlooked by those great authorities who have professed to look into all the bearings of this difficult question.

The principle effort in this direction is due to Captain Liernur. I will briefly describe the main features of this proposition, referring to "The Sewage Question," by Krepp, for further details. Captain Liernur proposes to place in houses a simple open-pan closet of a particular form, in connection with a vertical soil-pipe, and so shaped that the total excreta fall at once to the bottom of this pipe in the basement story of the house, where it collects in a small syphon bend. The soil-pipe is made of earthenware, 14 to 16 inches in diameter, and is continued to the top of the house, where it is open to the air, and covered with a wind-guard for ventilation. The syphon bend and bottom of the pipe are of cast-iron, narrowed from the soil-pipe to a 5-inch cast-iron pipe. This is continued to a central receiver, sunk in the public street. This reservoir has about 20 cubic feet capacity; and allowing 1 cubic foot to every thirty-six individuals, each serves about 700 persons and a number of houses. Each house has a so-called house-valve, which is accessible from the street, and closes the connection with the sewage reservoir. This reservoir may be placed in any central position in the public street, sunk under the ground, and surmounted by an ornamental lamp-post, within which the two communicating pipes are concealed. It is of a nearly spherical shape, or quite spherical top and bottom, with cylindrical sides. It receives the drain-pipes from a number of houses, collected in four main branches, which enter it with a slight bend at the top; the house pipes and main pipes are all about 5 inch bore, the former entering the latter horizontally at an angle of 30°, and a curve of 2 feet radius. The main pipes have a gentle downward inclination towards the reservoir, but enter it by a sudden bend upwards. There are two vertical pipes concealed within the lamp-post—one, the air-pipe, about 3 inch bore, fixed to the top of the reservoir; and the other the exit soil-pipe, about six inch bore, continued nearly to the bottom of the reservoir.

The mode of filling and emptying these receivers is by a "locomotive engine and pneumatic tender," which is drawn by one horse, assisted by the steam power of the engine, to the several reservoirs during the night. The process is simple; the engine works a powerful air-pump, which is placed in connection with the reservoir and the tender; in about three minutes the gauge indicates a vacuum of about 10 lbs. to the square inch, or about 20 in. barometer pressure, and both are sufficiently exhausted. The several house-valves are then opened and closed consecutively, and the contents of the syphons instantly shot into the receiver by the downward pressure of air in the soil-pipe, the vertical ventilating shaft acting like a pea-shooter. When all the house-traps are discharged, the air-pipe of the receiver is disconnected, the exit soil-pipe connected with the exhausted tender, the contents thus transferred to it, and the whole machine is driven off to the next reservoir; the foul gas from the air-pump is blown into the engine furnace. The tenders have each 100 cubic feet capacity, 10 cubic feet of which is used as a water-tank to the engine. When full, these are taken to "decanting houses," where the contents are transferred to barrels. The barrels are 28 inches in diameter, 32 inches long, about 5 cubic feet capacity, and made of strong oak staves bound with iron hoops; they form the stores for the manure, and for its transport, and are to be sold direct to farmers. For applying the contents directly to the soil, which is Captain Liernur's special object, he proposes plans of ingenious manure ploughs and meadow manurers, which support the barrel and empty its contents at once

into the furrow, where it is covered over and kept from decomposition. During frost, he proposes keeping these barrels in store.

The method of collecting, and particularly of applying, the excreta in these barrels, seems to me a most unnecessary complication. Glasgow would collect at the rate of 2,740 barrels a day, and a month's frost would accumulate an explosive store of 82,000 barrels; while in the summer I fear the barrels could not be used fast enough to prevent decomposition. There is also this great objection to this method, which applies, also, to irrigation, that we are compelled to sell our manure constantly to get it off our hands, and by making the farmer take it when he does not want it, and cannot advantageously apply it, we are entirely at his mercy, and must accept his prices; but if we could store it, make it into good manure, and sell it when he wants it, then, and not till then, can we expect to realise its full value. If the other parts of this plan work well, a modification would make this feasible.

We have a material to deal with in chemical works which presents some analogy with that under consideration; it must be kept from the air, it cannot be handled; but it is nearly double the weight of the excreta, and very corrosive. Yet this is lifted, without any difficulty, to great heights, and carried long distances, with no trouble and little expense, by atmospheric pressure; and could not the excreta be dealt with in the same way? The drain-pipes from the houses should be led into iron reservoirs, the size and number of these to be determined; the total daily removal being only 13,700 cubic feet; twelve cylindrical boilers with egg-shaped ends, about 10′ × 10′, by 15 to 20 feet long, sunk vertically, would be sufficient for Glasgow. It might, however, be advisable to have smaller vessels in larger number; that is a matter of detail.

These reservoirs are all to be connected by a small air-pipe, to one or more central pumping stations, where a powerful air-pump is fixed; each, also, is to be furnished with an exit soil-pipe, passing to the bottom, and continued up into a main pipe leading to one or two manure works situated some miles out of town.

This would, then, be the process of removal; at a fixed hour at night the air-pump would be set to exhaust a large iron reservoir at the pumping station, and communicating with the air pipes attached to the soil reservoirs. Two men for each district would then be sent round, and, opening the air-pipe valve, would place each receiver in connection with the exhausting pump, and then open, consecutively, the house-valves, by which means the soil-pipes would be nightly discharged, and the whole closet ventilated by a powerful blast of air. This is one operation. During the day, at a certain hour, the engine and air-pump would be reversed, and pump air into the air-vessel at the pumping station; the several soil reservoirs would then be placed in connection, and the contents lifted, by the atmospheric pressure, away to the manure works.

When we consider that a pressure of 50 lbs. on the square inch can be thus easily applied, there is merely the friction and some little weight to overcome; the plan seems quite practicable, and is, at any rate, worth a trial. The piping required would be an arterial system of small cast-iron piping; its cost, compared to sewers, would be little, and the cost for pumping must be insignificant, compared to that for lifting sewage in such enormous quantities.

The Abbey Mills pumping station has eight engines, 142 horse power each, or 1,136 horse power; and these lift 15,000 cubic feet a minute 36 feet high. We have only to lift 385 tons, or 13,700 cubic feet, and the whole day's produce of Glasgow may be contained in a tank 30 feet square and 16 feet deep. These pumps, therefore, would do our day's work in fifty-four seconds.

When engineers talk of intercepting sewers for our sewage, they mean immense culverts of brick, which leak in all directions, and are full of noxious gases, to carry off 137,000 tons of sewage a day, containing 385 tons, or 355th of excreta, and only 38½ tons, or 355th of its weight, of solid excreta. My notion of a true intercepting sewer is a perfectly tight and cheap cast-iron pipe, which will really intercept the excreta, and deal with it alone. It is, to all intents and purposes, a fluid, and subject to all the laws of fluid pressure; to add 355 times its weight of water to *make it fluid*, is not only "carting coals to Newcastle," but it is paying very heavily for the pleasure of doing so.

Engineers should consider the possibility of removing, without nuisance, the excreta, as it is, from where it is to where it should be; because, if it can be so delivered, the farther disposal of it can be safely left to chemists, who may, then, be fairly asked to turn it to account. We have not hitherto had a fair chance; engineers are allowed to mix the excreta with an amount of water, and then to turn round and ask chemists to separate it again, forgetting that the "*reductio ad absurdum*" is not a chemical process.

Dickens, in his preface to the last edition of "Pickwick Papers," after referring to the great improvements which have taken place since he wrote the work, ventures a hope that "it may some day be discovered that the universal diffusion of common decency and health is as much the right of the poorest of the poor as it is indispensable to the safety of the rich and of the state; that a few petty boards and bodies—less than drops in the great ocean of humanity which roars around them—are not for ever to let loose fever and consumption on God's creatures at their will, or always to keep their jobbing little fiddles going for a dance at death." (*To be continued.*)

FACTS ABOUT GAS FOR THE PEOPLE.

HOW TO READ THE METER.

THERE is no valid reason why consumers of gas should not be able to read the meter for themselves, and know exactly the amount of gas that is consumed. The meter is placed in every dwelling, giving equal privilege to the consumer as well as the gas company, to learn by its self-registering index the amount of gas consumed. If this knowledge was general, it would remove silly prejudice, that great "bone of contention" between those who pay for the gas and those who receive the pay, for it is a faithful arbiter, and gives no favour to one more than another.

The meters (both wet and dry) in ordinary use will be found to have three indexes; the hand on the first or right hand index moves to the right as the fingers read, and each index begins at a cipher (0) at the top and reads, 1 to 2 to 3 and so to the cipher again, which is 10. When the hand on the right index has moved to 1, it indicates that 100 cubic feet of gas have been used or passed the meter; when it points to 5 it means 500 feet, and after completing the circuit at (0) it is 1,000 feet. Each of the indexes are ten-fold multipliers of the one preceding. Single figures are used for want of room, but the multiplier is generally placed above the index; thus the right hand is "one thousand," the next to the left or middle index is "ten thousand," and the last or left hand index is "one hundred thousand." Therefore on the first or right hand index, 1 on the dial stands for 100; in the middle index 1 stands for 1,000; and 1 on the left hand index stands for 10,000, and so in this ratio with the succeeding figures respectively.

To read the meter, begin with the left index and write down the figure last passed by the pointer; then write down the figures last passed on the second index, and proceed in like manner with the third or right hand index. Now add two ciphers (00), and it will give the amount of gas registered in cubic feet. Suppose the first index was 2, the second index 5, and the third index 6, making 256, now add two ciphers, and you will have 25,600, being the amount of gas used at that time.

At the end of the month (or at any other time) read the meter again, and the figures will read—say 26,500 after adding the ciphers; now deduct the first sum from the last, and you will have the difference 900, which indicates the number of feet used since the first reading.

A few minutes' practice at reading meters, generally called "taking the meter," will make any one quite familiar with the matter, and will give the gas consumer a wonderful degree of satisfaction, and often bring about a much better feeling towards the gas company who supply the gas. Among other things it will show you

HOW TO DETECT ESCAPING GAS.

If your gas bills seem too high, or you have the evidence of escaping gas by sense of smell, but not positively so, take a reading of the meter when no burners are in use, and after an hour or so repeat the reading, and if gas is escaping it will be shown. To detect the locality of the leak is often a more difficult matter. The first thing is to see that no burners have been left turned on by accident, which is often the case where the cock has no *stop*, and is caused by the cock being turned partially round again so as to open the vent. Imperfect stop-cocks are for this reason dangerous, and should be at once removed.

The next thing to do in order to detect a leak is to try the joints of the gas fittings. The sense of smell will frequently be sufficient by bringing the face near the suspected joint; a lighted taper or match held near the joint is a more certain plan. If gas is escaping, it will take fire at the leak, or if too little to burn steadily it will momentarily catch and extinguish in little puffs.

Sometimes the gas escapes from the joints or imperfect piping between the ceiling and floor, or behind the walls or casings.

If beneath the floor, the sense of smell will generally detect the section of the floor under which the leak is, as it escapes owing to its levity upwards through the crevices of the floor, and penetrates the carpet, if there be one. If bracket or side burners are used, and the escaping gas is behind the walls or casings, the crevices in the casings, or the opening where the pipe enters the room, will let the escaping gas enter the room sufficiently at these points to indicate somewhat nearly the location of the leak.

In such cases the proper way is never to apply a light to the crevices or cases, but to turn off the gas at the meter and send for a gasfitter, otherwise an explosion may occur involving serious consequences. In ordinary leaks of gas fixtures and pipes, whether at the joints or at the attachment of the burner, the fitting or burner should be unscrewed and white lead or common bar soap rubbed in the threads, and then screwed home again. This can often be done without any aid from a gasfitter.—*American Gas Light Journal.*

THE MANUFACTURE OF GLUCOSE.

At the Conversazione of the Pharmaceutical Society, Mr. W. T. Fewtrell, F.C.S., exhibited a model of the "Converter" used in M. Alexander Manbré's process for making Glucose, and as many pharmacists have doubtless very vague ideas respecting the importance of the manufacture thus brought under their notice, we gladly impart some of the knowledge we obtained at the Saccharine Works, in Spitalfields. A single manufactory adapted for the production of 36 tons of glucose, *per diem*, from starch or grain, is an impressive sign of the industrial application of chemistry.

Ordinary Glucose or Dextro-glucose is a sugar produced by the hydration of starch, and existing ready-formed, together with other sugars, in honey and in various fruits, especially grapes. It is often called Starch-sugar, Fruit-sugar, Grape-sugar, or Honey-sugar, according to its origin. It is less sweet than cane-sugar, and is much less soluble in water.

When starch is subjected to the action of *diastase*, a peculiar ferment existing in malt, or when it is boiled with dilute *sulphuric acid*, it takes up the elements of water, and is resolved into glucose and dextrin or starch-gum. It was formerly supposed that the starch, by the action of the diastase or acid, was first converted into dextrin, and that the production of glucose was due to the subsequent hydration of the dextrin; but the recent experiments of Musculus* seem to prove that both glucose and dextrin are produced at the very commencement of the reaction in the proportion of 1 molecule of the former to 2 molecules of the latter, thus:

$$\underset{\text{Starch.}}{C_{18}H_{30}O_{15}} + \underset{\text{Water.}}{H_2O} = \underset{\text{Glucose.}}{C_6H_{12}O_6} + \underset{\text{Dextrin.}}{2C_6H_{10}O_5}$$

In France, Germany, and Russia, glucose is now extensively used in the arts, being known as *sirop de fécule, sirop de froment*, or *sirop massé*. It is commonly produced by boiling potato starch with very dilute sulphuric acid for from four to eight hours, neutralising the acid with calcium carbonate, and evaporating to the consistence required for obtaining either a syrup or solid mass. The glucose thus prepared is never pure, being mixed with a variable proportion of gum, and contaminated more or less with empyreumatic oil. It is, however, extensively used in brewing and in the preparation of all kinds of fermented liquors; for preserves, syrups, sweetmeats and cakes; and, if we mistake not, in the fabrication of spurious honey.

The process for which M. Manbré has obtained Letters Patent yields glucose uncontaminated by foreign substances, and specially adapted for the purposes of the brewer, the wine-maker, the confectioner, the chocolate-maker, and, possibly, of the pharmacist. This process consists in subjecting starch or finely-ground grain, suspended in water slightly acidulated, to the action of a temperature of about 320° Fahr. obtained by means of superheated steam, in a closed vessel. At this high temperature the conversion of the starch into glucose is at once effected, the albuminous matter of the grain is coagulated, and the empyreumatic oil is volatilised.

The apparatus employed for attaining the requisite temperature is a kind of boiler, called "the converter." It is a close vessel, made of wrought and cast-iron, capable of resisting a pressure of 90 lbs. to the square inch. It is built up in semi-cylindrical segments, with external flanges all round, which fit accurately together. The segments are each covered internally with sheets of lead to preserve the iron from corrosion, and these leaden sheets are turned down over the flanges of the segments and firmly clamped between them, when the said segments are fixed together and secured by screw bolts. The "converter" is provided inside with a perforated lead pipe, through which steam passes and blows up into the emulsion of starch; it is also provided at its top with an inlet cock, through which the emulsion is introduced, together with safety-valves, a steam-gauge, an exit steam cock, and a distilling pipe, through which the high

* See Fownes's *Manual of Chemistry*, new edition, p. 693.

pressure steam is allowed to blow off, carrying with it the empyreumatic oil, vaporised by the action of the high temperature to which the mixture is submitted.

Now, the process of converting starch into grape sugar, according to M. Manbré's process, is as follows:—

The starch is first mixed in a wooden vat, with about five times its weight of water, acidulated with about 2 per cent. of sulphuric acid. Steam of 100 lbs. pressure to the square inch is introduced into the converter, and then the starch emulsion is pumped in over the steam. The latter passes through the liquid, dividing it into extremely minute parts, transforming the starch into glucose and coagulating the nitrogenous matter. This transformation is instantaneous, but, as the starch is gradually pumped into the converter, the operation of converting a complete charge lasts about twenty minutes.

When the diluted starch is thus introduced into the converter, the inlet cock is shut while the steam is continuously admitted until the temperature of the mixture reaches 300°, when the empyreumatic oil is vaporized and blown off. The saccharified solution is then drawn into a wooden vessel, and the sulphuric acid, having been neutralised by calcium carbonate, and the excess of the latter precipitated, the liquid is passed through bag filters. The clear solution is evaporated *in vacuo*, then filtered through charcoal and evaporated again until it attains the required density to become solid on cooling.

Starch sugar produced by this process is quite pure, being free from gum, nitrogenous matter, and empyreumatic oil.

It is now extensively used in this country in conjunction with malt for brewing, being known as Manbre's Pure Malt Saccharine. According to a calculation, apparently based on trustworthy data, 1,075 lbs. of the saccharine may be advantageously employed instead of five quarters of malt in a brewing of forty barrels, for which ten quarters of malt would otherwise have been used. By this substitution, the quantity of nitrogenous matter produced is reduced to one-half, and the beer obtained contains more alcohol and carbonic acid, and is far less likely to turn sour than that made from malt alone. As the malting of barley is simply an operation for partially converting the starch of the grain into glucose, the substitution of pure glucose for malt seems a perfectly justifiable refinement of brewing.

The raw material of M. Manbré's manufacture is variable. Any pure form of starch, or any description of grain yielding starch, can be employed to feed the converter. Barley is very often employed, but on the occasion of our visit the sugar yielding material was tapioca. To a chemist accustomed to the small operations of the laboratory, the transformation of wagon-loads of starch into wagon-loads of sugar seems a grand result, and we cannot conclude this article without expressing our gratitude to M. Manbré for having permitted us to examine his works.

REGISTRATION OF TRADE MARKS.

THE Board of Trade have laid before the House of Commons a Bill for the voluntary registration of trade marks on payment of a fee not exceeding £5, and a further annual fee not exceeding 20s. The advantage of registration will be that the registered owner will be deemed, until the contrary is proved, to be entitled to the exclusive use of the trade mark. The registrar is not to register that which, in the opinion of the Board of Trade, is not a lawful trade mark, or which is the name of the person or firm only accompanied by a mark to distinguish it from the same name when used by other persons, or which is identical with a trade mark (appropriated to the same class of merchandise) already registered for a different owner, or so nearly resembling it as to be likely to deceive the public. But any lawful trade mark rightfully used at the time of the passing of the Bill may be registered. When two or more persons are entitled separately to the use (exclusively of other persons) of the same or a similar trade mark, each may have it registered. A transfer or partition of a trade mark is not to be registered if, in the opinion of the Board of Trade, it amounts to a misrepresentation, or is likely to deceive the public, or would not be recognised by law. Provision is made for a summary appeal to the Court of Chancery by a special case if the registrar refuses to register a trade mark or transfer thereof; any person who feels aggrieved by an improper entry in or omission from the register may apply to one of the superior courts for an order that the registry be rectified. The court, in such a case, may direct an issue to be tried. Persons obtaining an entry on the registry by false or fraudulent representations or declarations are to be punishable with imprisonment for a term not exceeding 12 months, with or without hard labour. There is to be a penalty, not exceeding £20, for falsely pretending to be registered. Nothing in this Bill is to entitle a person to refuse to make a complete discovery by answer to a bill in equity, or upon any hearing in court; and no person is to be liable to be convicted of an offence under this Bill by any evidence whatever in respect of any act done by him if he has, previously to being charged with such offence, disclosed such act on oath under any compulsory process in a proceeding *bonâ fide* instituted by a party aggrieved. The Bill is not to affect the rights of the Corporation of Cutlers of the liberty of Hallamshire, or repeal the Act the 59th George III., regulating the cutlery trade.

SYRUPS FOR AËRATED WATERS.

THE following receipts, furnished by Mr. P. W. Bedford, are printed in the July number of the *American Druggists' Circular*:—

I.—*Sarsaparilla Syrup.*

Take of white sugarhouse syrup, 1 gallon; water, 1 pint; holding in solution one-eighth ounce each of extract of liquorice, gum arabic, and sulphate of iron. A portion of the syrup to be rubbed up with a quarter of an ounce of wintergreen and sassafras.

II.—*Sarsaparilla Syrup (Parrish's).*

Take of simple syrup, 4 pints; compound syrup of sarsaparilla, 4 fluid ounces; caramel, 1½ fluid ounces; oil of wintergreen and sassafras, of each, 6 drops.

III.—*Lemon Syrup.*

Dissolve 1 ounce of citric acid in 4 of water, and add to 9 pints of simple syrup; also, add 4 fluid ounces of mucilage acaciæ and a half fluid ounce of spiritus limonis.

IV.—*Another Formula.*

Grate off the yellow rind of lemons, and beat it up with a sufficient quantity of granulated sugar. Express the lemon-juice; add to each pint of juice 1 pint of water, and 3½ pounds of granulated sugar, including that rubbed up with the rind; warm until the sugar is dissolved, and strain.

V.—*Another Formula.*

Dissolve 6 drachms of tartaric acid and 1 ounce of gum arabic, in pieces, in 1 gallon of simple syrup; then flavour with 1½ fluid drachms of best oil of lemon. Or flavour with the saturated tincture of the peel in cologne spirits.

VI.—*Orange Syrup.*

To be prepared from the fruit in the same manner as IV.

VII.—*Another Formula.*

Dissolve 6 drachms of citric acid in 1 gallon of simple syrup, and add 2 fluid drachms of fresh oil of orange in two

ounces of alcohol; or, instead of the alcohol solution of the oil, use the saturated tincture obtained by macerating the fresh peel for ten days in sufficient cologne spirits to cover. The lemon and orange syrups, made from the fruit, after being strained, may be diluted with an equal bulk of simple syrup. One dozen of the fruit is sufficient to make 1 gallon of finished syrup.

VIII.—*Ginger Syrup.*

Mix 2 fluid ounces of tinctura zingiberis with 4 pints of simple syrup.

IX.—*Vanilla Syrup.*

Mix 2 fluid ounces of fluid extract of vanilla with 4 pints of simple syrup.

X.—*Syrup of Coffee.*

Pure coffee, roasted, half a pound, is infused in boiling water, half a gallon; enough is filtered off to make half a gallon of infusion, in which dissolve 7 pounds of granulated sugar.

XI. and XII.—*Strawberry and Raspberry Syrups.*

Mash the fresh fruit, express the juice, and to each quart add 3½ pounds of granulated sugar. The juice, heated to 180 degrees Fahrenheit, and strained or filtered previous to dissolving the sugar, will keep for an indefinite time.

XIII.—*Pineapple Syrup.*

Same as XI. and XII.

XIV.—*Nectar Syrup.*

Mix 3 parts of vanilla syrup with 1 each of pineapple and lemon syrup.

XV.—*Sherbet Syrup.*

Mix equal parts of orange, pineapple, and vanilla syrup.

XVI.—*Grape Syrup.*

Mix half a pint of brandy, quarter of an ounce of spirits of lemon, and sufficient tincture of red Saunders with one gallon of simple syrup.

XVII.—*Wild Cherry Syrup.*

Use either the U. S. Pharmacopœia process, or prepare from the fresh cherries by expressing them with the stones.

XVIII.—*Cream Syrup.*

Take of Borden's condensed milk, 1 pint; water, 1 pint; sugar, 1½ pounds. Heat to boiling, and strain. This will keep for over a week in a cool place.

XIX.—*Orgeat Syrup.*

Cream syrup and vanilla syrup, each 1 pint; oil of bitter almonds, 4 minims.

XX.—*Maple Syrup.*

Dissolve 3½ pounds of maple sugar in 1 quart of water. [Most of the syrups not made from fruits may have a little gum arabic added, in order to produce a rich froth.]

XXI.—*Chocolate Syrup.*

Baker's chocolate, 4 ounces; dissolve in 20 ounces of boiling water, and dissolve in this 1 pound av. of granulated sugar.

PROPOSED MEMORIAL TO FARADAY.*

ON Monday, the 21st ult., a public meeting was held in the theatre of the Royal Institution, Albemarle-street, for the purpose of considering what measures shall be taken for the promotion of a memorial to Professor Faraday, whose voice was so often heard as a lecturer within those very walls. The chair was taken at half-past three by his Royal Highness the Prince of Wales, who was supported by M. Dumas, Count Strelecki, General Sabine (the President of the Royal Society), Sir Henry Holland (President of the Royal Institution), Sir Roderick Murchison (President of the Royal Geographical Society), Sir Charles Wheatstone, Professor Williamson, Admiral Manners, Colonel Yorke, Professor Frankland, Mr. De la Rue, Mr. Frederick Pollock, Dr. Gladstone, Mr. Cæsar Hawkins, Dr. Holtzmann, Dr. H. Bence Jones (Secretary to the Committee), Dr. Lyon Playfair, M.P., Professor Tyndall, Professor Graham (the Master of the Mint), Sir John Lubbock, Sir Benjamin Brodie, Mr. Gassiot, Professor Miller, and a number of other distinguished personages, both English and foreign. The Astronomer Royal, Sir John Herschel, the Marquis of Salisbury, Mr. Layard, and other gentlemen who had been expected, sent letters to apologise for their absence.

The proceedings were opened by his Royal Highness, who, in a few well-chosen words, expressed the pleasure which it gave him, both on public and on private grounds, to preside over such a meeting as the present, and reminded his hearers that, although he whom they had met together to commemorate had been dead for nearly two years, yet nothing had been done by the public as yet to perpetuate his memory. Early in 1868, the Council of the Royal Society requested the President to take measures for the holding of a meeting to promote a monument to Faraday, and, with that view, the Secretary was instructed to write to the presidents of the following societies:—The Royal Society, the Geographical, the Linnæan, the Geological, the Royal Astronomical Society, and the British Association. On the 24th of March, a meeting of the presidents was held, and it was thought desirable, before proceeding further, to learn the views of her Majesty's Government as to the erection of a monument as a recognition of his pre-eminent services to science and mankind. On the 22nd of June, Mr. Disraeli desired his secretary to say that he considered a monument to Faraday a proper object; but he suggested that its consideration should be left till next year. In the present year, the present Chancellor of the Exchequer wrote, saying that he had no doubt of the signal merits of Faraday, and he thought that a monument ought to be erected; but he could not consent to devote public money to a monument for a private citizen, however illustrious. He did not make this rule; he found it. On the 8th of June, it was resolved to hold a public meeting at the Royal Institution. Under these circumstances, the Council of the Royal Society, and the presidents of the various other learned societies, had resolved to take the matter seriously in hand, without further loss of time, and the result was the present meeting, at which it gave him the greatest pleasure to take the chair.

The first resolution—"That it is desirable that measures should be taken to provide a public memorial to the late Professor Faraday"—was proposed in a short speech by General Sabine, who said that the Royal Society, over which he had the honour to preside, felt a pride and a pleasure in reckoning Michael Faraday as one of its members, and bore his testimony to the fact that, out of all its long list of Fellows, none had contributed such a valuable collection of papers to the *Philosophical Transactions*.

This resolution was seconded by M. Dumas, Senator, Member of the Academy of France, and Permanent Secretary of the French Institute. M. Dumas began by reminding his audience of Faraday, whose genius achieved so much in the cause of science, and, therefore, of civilisation generally, was one of the eight Foreign Associates of the Academy of Sciences of the Institute of France. He also said that it was with a feeling of profound emotion that he now found himself standing in the place where his late great contemporary had stood so often. M. Dumas declared that in France, Faraday commands as many admirers as in England, and that among these admirers the Emperor of the French stands foremost—so much so, indeed, that his Imperial Majesty never loses an opportunity of evincing his regard for the name of the great *savant*, after whom Paris had named a street, and whose discoveries have not only done honour to England, but have been of incalculable service to the interests of the world at large. M. Dumas then proceeded with great eloquence and perspicuity to touch in detail upon some of the scientific achievements of Faraday, and took occasion to observe that his genius, in its various applications of science to practical purposes, was distinguished by originality, not less than by profundity, instancing his condensation of gas into liquids, his manufacture of steel and of glass, his magneto-electric currents which encircle the world in the telegraph wires, and his magneto-electric light, to be seen in the most important lighthouses of England and of France. M. Dumas wound up his speech by expressing, in a tone of deep emotion, his own personal

* From the *Chemical News*.

regard for a man who was singularly distinguished by his virtues in private life. There were many present who sympathised with M. Dumas when he added that the world at large had cause to lament the loss of Faraday as one of the greatest philosophers who ever shed a light upon it by the force of genius, but that he himself had still greater cause to lament in his death the loss of a friend.

Sir HENRY HOLLAND moved the second resolution,—"That the following gentlemen be a committee to take the necessary measures for the provision of the said public memorial in honour of Faraday: General Sabine, President of the Royal Society; Sir Henry Holland, President of the Royal Institution; Sir Roderick Murchison, President of the Geographical Society; Dr. Williamson, President of the Chemical Society; Mr. George Bentham, President of the Linnæan Society; Mr. T. H. Huxley, President of the Geological Society; Admiral Manners, President of the Astronomical Society; Dr. W. J. Hooker, President of the British Association; the Right Hon. A. H. Layard, M.P., Mr. J. Fergusson, Mr. Gassiot, Dr. Tyndall, Mr. Grove, Dr. Frankland, Mr. De la Rue, and Dr. Bence Jones, with power to add to their number."

The resolution was seconded by Sir RODERICK MURCHISON, who referred to the fact that in that very theatre, more than sixty years ago, he had seen Sir Humphry Davy make some of those experiments in electricity which now formed the basis of modern science; and that, standing on the very spot where the Prince now sat, Faraday, year after year, had carried on those experiments after his master's death, training two successive generations of disciples in the study of the laws of nature. He bore willing and grateful testimony to the extreme modesty and humility of the great man who for more than half a century had made that institution his home, and adverted to the fact that Faraday had first shown marks of his high genius within the walls of the Institution in the year 1823, when, Mr. Brande being taken ill, and unable to lecture, the duty of lecturing suddenly devolved on his assistant, whose simplicity, sincerity, and genuineness of character even then had begun to make themselves felt, and were but an augury of his after life.

Professor OWEN moved the third resolution, to the effect "That a subscription, not exceeding five guineas in amount from any one person, be made for the provision of a public memorial to Faraday." He prefaced this resolution by a few remarks, to the effect that the theatre in which they were assembled was redolent of Faraday, and seemed haunted by his spirit. Great and deep was the learning which he displayed as a lecturer, still his profound and subtle generalisations were almost exceeded by that playfulness of wit by which he raised the intelligence of his hearers without lowering himself from the height of his professional dignity. Of his genius they had heard already from M. Dumas; but enough could scarcely be said of his personal merits, his singular modesty, and that unconsciousness of genius which is so often combined with genius of the highest order, as in Wellington. Like him, Faraday sought no honours, and all that he gained came to him unsought; but Englishmen feel that they all have a share in the achievements of both, and the reputation of the great philosopher, like that of the great warrior, is reflected on all his countrymen. Those, therefore, who are devoted to science have a right to call upon not only men of science, but Englishmen in general, to acknowledge and to pay the debt which we owe to Faraday. Let us think what will be the feelings of a future generation who will look back to him as we look back to Newton. His discoveries of the grand secrets of nature have added to our stores of wealth and ministered to our comforts, and hereafter there will arise the feeling that we have not done as much as we ought for one who has done much for us. He then urged that Faraday and the Royal Institution were standing proofs of the results which could arise out of the voluntary system as opposed to State establishments. Faraday served a voluntary body—a "joint-stock company founded for the purpose of diffusing intellectual pleasure," and this body whom he served gave him a home in which he might carry out his experiments in the field of science. Late in life had come a public recognition of his services, in the shape of a pension and a house at Hampton Court—the latter a free gift for life from his Sovereign. He observed that, as the introduction of the electric telegraph and gas had added to the conveniences and comforts of life, and had helped to diminish crime, the discoverers of such secrets of nature at the very least deserved some reward at the hands of those to whom they ministered—if not from the nation in its collective capacity, at least from its individual members; and he concluded his speech by remarking that, if any member of either House of Parliament should chance to be present there, he ought to take note of the right relations of the nation to men of science.

The resolution was seconded in a few brief but telling sentences by Dr. LYON PLAYFAIR, M.P.

The three resolutions were severally put to the meeting by his Royal Highness, and declared to be carried unanimously.

A vote of thanks to the Prince for his kindness in presiding over the meeting, and for his conduct in the chair was proposed by Sir HENRY HOLLAND, and seconded by Professor TYNDALL, who spoke with great feeling of the loss which both himself and the nation had sustained in the death of Faraday, and alluded to the fact that on that occasion the Prince had been among the first to write to condole with his widow. The motion was carried with great applause.

Dr. BENCE JONES then read a letter from Sir John Herschel, excusing his absence on the ground of illness; it ran as follows:—

"I grieve to say that I can only be present in spirit at the meeting of next Monday, the state of my health being such as to preclude my leaving home for many months, most anxious though I should naturally be to show every possible reverence and honour to the memory of such a man as Faraday, whom I have always regarded as the "blameless prophet" of British science—so clear and far-reaching was he in his views, so indefatigable in their pursuit, so single in his objects, so blameless in his life, so genuine, candid, and unaggressive in all his relations with his brother *savants*."

The PRINCE briefly acknowledged the vote of thanks, and assured the meeting that he should be proud to lend his aid to the cause which they had met to promote, and it was announced that subscriptions to the "Faraday Memorial Fund" might be paid in at the Bank of England, Western Branch, Burlington-gardens; the London and Westminster Bank, St. James's-square; to Mr. William Hughes, at the Royal Institution, Albemarle-street; or to any members of the committee.

MICHAEL FARADAY.

BY DR. H. BENCE JONES, F.R.S.*

Æt. 50 (1842).

He resumed the Friday evening lectures, and gave one on the Conduction of Electricity in Lightning-rods, and one on the Principles and Practice of Hullmandel's Lithotint. This year he made four reports to the Trinity House:—1, on comparison of the amount of Light cut off by French glass and by Newcastle glass; 2, on a new Mode of suspending the Mirrors; 3, its application to the Lundy Lighthouse, so as to save light; 4, a Report on the Ventilation of the Tynemouth Light; and he went to see the operation of the grinding-apparatus for lenses at Newcastle.

To Dr. T. M. Browne, who had asserted the isomerism of carbon and silicon, and who asked Faraday to witness his experiments and give him a written testimonial if they were satisfactory, he writes:—"That which made me inaccessible to you makes me so in a very great degree to all my friends—*ill health connected with my head*; and I have been obliged, and I am still, to lay by nearly all my own pursuits, and to deny myself the pleasure of society, either in seeing myself in my friends' houses or them here. This alone would prevent me from acceding to your request. I should, if I assented, do it against the strict advice of my friends, medical and social.

"The matter of your request makes me add a word or two, which I hope you will excuse. Any one who does what you ask of me, *i.e.*, certify if the experiment is successful, is bound, without escape, to certify and publish also *if it fail*;

* Continued from page 354.

and I think you may consider that very few persons would be willing to do this. I certainly would not put myself in such a most unpleasant condition."

This year he was made Chevalier of the Prussian Order of Merit (one of thirty), and Foreign Associate of the Royal Academy of Sciences, Berlin.

Æt. 51 (1843).

Early this year he sent the eighteenth series of his "Researches" to the Royal Society. It was on the electricity evolved by the friction of water and steam against other bodies. This had been first observed by Sir W. Armstrong, and was attributed to evaporation, and was thought to be related to atmospheric electricity. He concluded, "the cause being, I believe, friction, has no effect in producing, and is not connected with, the general electricity of the atmosphere."

He read a paper at the Institution of Civil Engineers on the ventilation of lighthouse lamps, the points necessary to be observed, and the manner in which these have been, or may be, attained.

He gave three Friday discourses on some Phenomena of Electric Induction, on the Ventilation of Lamp-burners, and on the Electricity of Steam.

For the Trinity House he went to the South Foreland lighthouses regarding their ventilation. He inspected the dioptric light of the first order, which had just been constructed in France, and put up by French workmen, and compared its consumption of oil with the 15 Argand burners which were previously in use.

He sent to the *Philosophical Magazine* a paper on Static Electrical Inductive Action. Among his notes the following occurs:—"Propose to send to the *Phil. Mag.* for consideration the subject of a bar, or circular, or spherical magnet—first, in the strong magnetic field; then charged by it; and, finally, taken away and placed in space. Inquire the disposition of the dual force, the open or the related powers of the poles externally, and if they can exist unrelated. The difference between the state of the power, when related and when not, consistent with the conservation of force. Avoid any particular language. Should not pledge myself to answer any particular observations, or to any one, against open consideration of the subject. Want to direct the thoughts of all upon the subject, and to tie it there; and especially to gather for myself thought on the point of relation or non-relation of the antithetical force or polarites."

He was made Honorary Member of the Literary and Philosophical Society of Manchester, and Useful Knowledge Society, Aix la Chapelle.

Æt. 52 (1844).

He communicated to the Royal Society a paper on the Liquefaction and Solidification of Bodies generally existing as Gases. His object was to subject the gases to considerable pressure, with considerable depression of temperature. Though he did not condense oxygen, hydrogen, or nitrogen, the original objects of his pursuit, he added six substances, usually gaseous, to the list of those that could previously be shown in the liquid state, and he reduced seven, including ammonia, nitrous oxide, and sulphuretted hydrogen, into the solid form.

He sent to the *Philosophical Magazine* a speculation touching electric conduction and the nature of matter. Elsewhere he calls this "a speculation respecting that view of the nature of matter which considers its ultimate atoms as centres of force, and not as so many little bodies surrounded by forces, the bodies being considered in the abstract as independent of the forces, and capable of existing without them. In the latter view these little particles have a definite form and a certain limited size. In the former view such is not the case; for that which represents size may be considered as extending to any distance to which the lines of force of the particle extend. The particle, indeed, is supposed to exist only by these forces, and where they are it is."

This was the subject of his first Friday discourse. He also gave the last discourse on recent improvements in the Manufacture and Silvering of Mirrors.

For the Trinity House he only examined different cottons for the lamps.

In October he was sent by Sir James Graham with Mr. Lyell to attend the inquest on those who had died by the explosion in the Haswell colliery.

The following account is by Sir Charles:—

"Faraday undertook the charge with much reluctance, but no sooner had he accepted it than he seemed to be quite at home in his new vocation. He was seated near the coroner, and cross-examined the witnesses with as much talent, skill, and self-possession as if he had been an old practitioner at the bar. We spent eight hours, not without danger, in exploring the galleries where the chief loss of life had been incurred. Among other questions, Faraday asked in what way they measured the rate at which the current of air flowed in the mine. An inspector took a small pinch of gunpowder out of a box, as he might have taken a pinch of snuff, and allowed it to fall gradually through the flame of a candle which he held in the other hand. His companion, with a watch, marked the time the smoke took going a certain distance. Faraday admitted that this plan was sufficiently accurate for their purpose; but, observing the somewhat careless manner in which they handled their powder, he asked where they kept it. They said they kept it in a bag, the neck of which was tied up tight. But where, said he, do you keep the bag? you are sitting on it was the reply; for they had given this soft and yielding seat, as the most comfortable one at hand, to the Commissioner. He sprang up on his feet, and, in a most animated and expressive style, expostulated with them for their carelessness, which, as he said, was especially discreditable to those who should be setting an example of vigilance and caution to others who were hourly exposed to the danger of explosions.....Hearing that a subscription had been opened for the widows and orphans of the men who had perished by the explosion, I found, on inquiry, that Faraday had already contributed largely. On speaking to him on the subject, he apologised for having done so without mentioning it to me, saying that he did not wish me to feel myself called upon to subscribe because he had done so."

To a lady of the highest talent, who proposed to become his disciple, to go through with him all his own experiments, he wrote:—"That I should rejoice to aid you in your purpose you cannot doubt, but nature is against you. You have all the confidence of unbaulked health and youth, both in body and mind. I am a labourer of many years' standing, made daily to feel my wearing out. You, with increasing acquisition of knowledge, enlarge your views and intentions. I, though I may gain from day to day some little maturity of thought, feel the decay of powers, and am constrained to a continual process of lessening my intentions and contracting my pursuits. Many a fair discovery stands before me in thought which I once intended, and even now desire, to work out; but I lose all hope respecting them when I turn my thoughts to that one which is in hand, and see how slowly, for want of time and physical power, it advances, and how likely it is to be not only a barrier between me and the many beyond in intellectual view, but even the last upon the list of those practically wrought out. Understand me in this; I am not saying that my mind is wearing out, but those physico-mental faculties by which the mind and body are kept in conjunction and work together, and especially the memory, fail me, and hence a limitation of all I was once able to perform with a much smaller extent than heretofore. It is this which has had a great effect in moulding portions of my later life, has tended to withdraw me from the communion and pursuits of men of science my cotemporaries, has lessened the number of points of investigation (that might at some time have become discoveries) which I now pursue, and which, in conjunction with its effects, makes me say most unwillingly that I dare not undertake what you propose—to go with you through even my own experiments. You do not know, and should not now, but that I have no concealment on this point from you, how often I have to go to my medical friend to speak of giddiness and aching of the head, and how often he has to bid me cease from restless thoughts and mental occupation, and retire to the seaside to inaction. You speak of religion, and here you will be sadly disappointed in me. You will perhaps remember that I guessed, and not very far aside, your tendency in this respect. Your confidence in me claims in return mine to you, which, indeed, I have no hesitation to give on fitting occasions; but these I think are very few, for in my mind

religious conversation is generally in vain. There is no philosophy in my religion. I am of a very small and despised sect of Christians, known, if known at all, as *Sandemanians*, and our hope is founded on the faith that is in Christ. But though the natural works of God can never by any possibility come in contradiction with the higher things which belong to our future existence, and must with everything concerning him ever glorify him, still I do not think it at all necessary to tie the study of the natural sciences and religion together; and in my intercourse with my fellow-creatures that which is religious and that which is philosophical have ever been two distinct things."

In answer to Mr. Magrath, who sent him, from the *Journal des Débats*, notice of his election as one of the eight foreign associates of the Academy of Sciences, Paris, he said:—"I received by this morning's post notice of the event in a letter from Dumas, who wrote from the Academy at the moment of the deciding the ballot, and, to make it more pleasant, Arago directed it on the outside."

He was also made Honorary Member of the Sheffield Scientific Society.

Æt. 53 (1845).

This year produced the nineteenth series of Researches on the Magnetization of Light and the Illumination of Magnetic Lines of Force:—1. Action of Magnets on light; 2. Action of Electric Currents on Light; 3. General considerations. Also the twentieth series, on new Magnetic Actions, and on the Magnetic Conditions of all Matter:—1. Apparatus required; 2. Action of Magnets on heavy glass; 3. Action of Magnets on other substances acting magnetically on light; 4. Action of Magnets on the Metals generally. And the twenty-first series, on new Magnetic Actions, and on the Magnetic Condition of all matter (continued): 5. Action of Magnets on the Magnetic Metals and their compounds; 6. Action of Magnets on Air and Gases; 7. General considerations.

For the Trinity House he made a long and exact comparison of the consumption and light of sperm and rape-oil. He gave a Friday discourse on the Condition and Ventilation of the Coal-mine Goaf, and another on the liquefaction and solidification of bodies usually gaseous; another on anastatic painting, and on the Artesian well in Trafalgar Square.

Early in the year he thus wrote to Prof. Auguste De la Rive:—"I have waited and waited for a result, intending to write off to you on the instant, and hoping by that to give a little value to my letter, until now, when the time being gone and the result not having arrived, I am in a worse condition than ever; and the only value my letter can have will be in the kindness with which you will receive it. The result I hoped for was the condensation of oxygen; but though I have squeezed him with a pressure of 60 atmospheres at the temperature of 140° F. below 0°, he would not settle down into the liquid or solid state; and now, being tired and ill and obliged to prepare for lectures, I must put the subject aside for a little while.

"Nitrogen is certainly a strange body. It encourages every sort of guess about its nature, and will satisfy none. I have been trying to look at it in the condensed state, but as yet it escapes me.

"I thank you most truly, not only for the invitation (to the scientific meeting) you have sent me, but for all the favour you would willingly show me. Do you remember one hot day (I cannot tell how many years ago) when I was hot and thirsty in Geneva, and you took me to your house in the town and gave me a glass of water and raspberry vinegar? That glass of drink is refreshing to me still."

Late in the year he writes to M. De la Rive:—"I have had your last letter by me for several weeks intending to answer it, but absolutely I have not been able; for of late I have shut myself up in my laboratory and wrought to the exclusion of everything else..... I am still so involved in discovery that I have hardly time for my meals, and am here at Brighton both to refresh and work my head at once; and I feel that unless I had been here and been careful I could not have continued my labours. The consequence has been that last Monday I announced to our members at the Royal Institution another discovery, of which I will give you the pith:—

"Many years ago I worked upon optical glass, and made a vitreous compound of silica, boracic acid, and lead, which I will now call heavy glass. It was this substance that enabled me first to act upon light by magnetic and electric forces. Now, if a square bar of this substance, about half an inch thick and two inches long, be very freely suspended between the poles of a powerful horseshoe electro-magnet, immediately that the magnetic force is developed, the bar points, but it does not point from pole to pole, but equatorially or across the magnetic lines of force, *i.e.*, east and west in respect of the north and south poles. If it be moved from this position it returns to it, and this continues as long as the magnetic force is in action. This effect is the result of a still simpler action of the magnet on the bar than what appears by the experiment, and which may be obtained at a single magnetic pole. For if a cubical or rounded piece of the glass be suspended by a fine thread 6 or 8 feet long, and allowed to hang very near a strong magneto-electric pole (not as yet made active), then, on rendering the pole magnetic, the glass will be repelled until the magnetism ceases. This effect and power I have worked out through a great number of its forms and strange consequences, and they will occupy two series of the 'Experimental Researches.' It belongs *to all matter* (not magnetic, as iron) without exception; so that every substance belongs to one or the other class of magnetic or diamagnetic bodies. The law of action in its simplest form is that such matter tends to go from strong to weak points of magnetic force, and in doing this the substance will go in either direction along the magnetic curves, or in either direction across them. It is curious that amongst the metals are found bodies possessing this property in as high a degree as perhaps any other substance; in fact, I do not know at present whether heavy glass, or bismuth, or phosphorus is the most striking in this respect."

In July he went with Mrs. Faraday and Mr. G. Barnard to France for three weeks, partly to inspect the lighthouses at Fecamp, Havre, Harfleur, and Cap de la Haye. His chief object was to be received into the Academy. At the same time he gained all the information he could regarding French lighthouses from M. H. Le Ponte and M. Fresnel. M. Dumas was his most constant companion in his visits to Chevreul, Milne-Edwards, Biot, Arago, the Well of Grenelle, and the water-works at Chaillot. On the 30th of July he went to the Institute. "Many of the members were gone out of town, but all that were there received me very kindly. I was glad to see Thenard, Dupuis, Flourens, Biot, Dumas of course, and Arago, Elie de Beaumont, Poinsot, Babinet, and a great many others whose names and faces sadly embarrassed my poor head and memory. Chatting together, Arago told me he was my senior, being born in 1786, and consequently 59 years of age."

He finishes his journal thus:—"We left George at the London Bridge Station; thanks be to him for all his kind care and attention on the journey, which is better worth remembering than anything else of all that which occurred in it."

He was made Corresponding Member of the National Institute, Washington, and of the Société d'Encouragement, Paris.

Æt. 54 (1846).

Early in the year he gave a Friday discourse on the relation of Magnetism and Light, and another on the Magnetic Condition of Matter, and, later in the season, another on Wheatstone's Electro-magnetic Chronoscope, at the end of which he said he was induced to utter a speculation long on his mind, and constantly gaining strength, viz., that perhaps those vibrations by which radiant agencies, such as light, heat, actinic influence, &c., convey this force through space, are not vibrations of an ether, but of the lines of force which, in his view, equally connect the most distant masses together and make the smallest atoms or particles by their properties influential on each other and perceptible to us. A little later he sends these views to the *Philosophical Magazine* as thoughts on ray vibrations; "but, from first to last, understand that I merely throw out, as matter for speculation, the vague impressions of my mind; for I give nothing as the result of sufficient consideration or as the settled conviction, or even probable conclusion at

which I had arrived." His last Friday discourse was on the Cohesive Force of Water.

He reported to the Trinity House on drinking-water of the Smalls Lighthouse, and on a ventilation apparatus for rape-oil lamps.

To the Secretary of the Institution, who consulted him regarding evening lectures, he said, "I see no objection to evening lectures if you can find a fit man to give them. As to popular lectures (which at the same time are to be *respectable* and *sound*), none are more difficult to find. Lectures which *really teach* will never be popular; lectures which are popular will never *really teach*. They know little of the matter who think science is more easily to be taught or learned than A B C; and yet who ever learned his A B C without pain and trouble? Still lectures can (generally) inform the mind and show forth to the attentive man what he really has to learn, and in their way are very useful, especially to the public. I think they might be useful to us now, even if they only gave an answer to those who, judging by their own earnest desire to learn, think much of them. As to agricultural chemistry, it is no doubt an excellent and a popular subject; but I rather suspect that those who know least of it think that most is known about it."

He received both the Rumford and a Royal Medal, and was made Honorary Member of the Society of Sciences, Vaud.

Æt. 55 (1847).

He gave Friday discourses on the Combustion of Gunpowder; on Mr. Barry's mode of ventilating the New House of Lords; and on the Steam-jet chiefly as a means of procuring ventilation.

He reported to the Trinity House on the ventilation of the South Foreland lights, and on a proposal to light buoys by platinum wire ignited by electricity.

He writes to the first Lord of the Admiralty from Edinburgh:—"For years past my health has been more and more affected; and the place affected is my head. My medical advisers say it is from mental occupation. The result is loss of memory, confusion, and giddiness; the sole remedy, cessation from such occupation and head rest. I have in consequence given up, for the last ten years or more, all professional occupation, and voluntarily resigned a large income that I might pursue in some degree my own objects of research. But in doing this I have, always, as a good subject, held myself ready to assist the Government if still in my power—*not for pay*, for, except in one instance (and then only for the sake of the person joined with me), I refused to take it. I have had the honour and pleasure of applications, and that very recently, from the Admiralty, the Ordnance, the Home Office, the Woods and Forests, and other departments, all of which I have replied to, and will reply to as long as strength is left me; and now it is to the condition under which I am obliged to do this that I am anxious to call your Lordship's attention in the present case. I shall be most happy to give my advice and opinion in any case as may be at the time within my knowledge or power, but I may not undertake to enter into investigations or experiments. If I were in London I would wait upon your Lordship, and say all I could upon the subject of the disinfecting fluids, but I would not undertake the experimental investigation; and in saying this I am sure that I shall have your sympathy and approbation when I state that it is now more than three weeks since I left London to obtain the benefit of change of air, and yet my giddiness is so little alleviated that I don't feel in any degree confident that I shall ever be able to return to my recent occupations and duties."

To Professor Schönbein he writes, three months later:—"I shame to say that I have not yet repeated the experiments (on ozone), but my head has been so giddy that my doctors have absolutely forbidden me the privilege and pleasure of working or thinking for a while; and so I am constrained to go out of town, be a hermit, and take absolute rest. In thinking of my own case it makes me rejoice to know of your health and strength, and look on whilst you labour with a constancy so unremitting and so successful."

He was made Member of the Academy of Sciences, Bologna, Foreign Associate of the Royal Academy of Sciences, Belgium, Fellow of the Royal Bavarian Academy of Sciences, Munich, and Correspondent of the Academy of Natural Sciences, Philadelphia.

Æt. 56 (1848).

He this year communicated his twenty-second series of "Researches" as the Bakerian lecture. It was on the Crystalline Polarity of Bismuth (and other bodies), and on its relation to the Magnetic form of Force. 1. Crystalline Polarity of Bismuth; 2. Crystalline Polarity of Antimony; 3. Crystalline Polarity of Arsenic. The second part of this series on the same subject was (4) on the Crystalline Condition of various bodies, and (5) Nature of the Magne-crystallic Force, and general observations.

"I cannot conclude this series of Researches," he says, "without remarking how rapidly the knowledge of molecular forces grows upon us, and how strikingly every investigation tends to develope more and more their importance and their extreme attraction as an object of study. A few years ago magnetism was to us an occult power affecting only a few bodies; now it is found to influence all bodies, and to possess the most intimate relations with electricity, heat, chemical action, light, crystallization, and, through it, with the forces concerned in cohesion; and we may, in the present state of things, well feel urged to continue in our labours, encouraged by the hope of bringing it into a bond of union with gravity itself."

He gave three Friday discourses on the Diamagnetic Condition of Flame and Gases; on two recent inventions of Artificial Stone; and on the Conversion of Diamond into Coke by the Electric Flame.

He was made Foreign Honorary Member (one of eight) of the Imperial Academy of Sciences, Vienna, and Doctor of Liberal Arts and Philosophy in the University of Prague.

Æt. 57 (1849).

He gave two Friday discourses, one on Plücker's repulsion of the Optic Axes of Crystals by the Magnetic Poles; and the other on De la Rue's Envelope Machinery.

He reported to the Trinity House on the ventilation of Flambro' Head, Dungeness, Needles, and Portland Lighthouses.

He was made Honorary Member, First Class, Institute Royale des Pays-Bas, and Foreign Correspondent of the Institute, Madrid.

Æt. 58 (1850).

The twenty-third series of Researches in Electricity appeared, on the Polar or other Condition of Diamagnetic Bodies. The twenty-fourth series was the Bakerian lecture, on the possible relation of Gravity to Electricity. He finishes this paper, saying, "Here end my trials for the present. The results are negative; they do not shake my strong feeling of the existence of a relation between gravity and electricity, though they give no proof that such a relation exists." The twenty-fifth series was on the Magnetic and Diamagnetic Condition of Bodies:—1. Non-expansion of Gaseous Bodies by Magnetic Force. 2. Differential Magnetic Action. 3. Magnetic characters of Oxygen, Nitrogen, and Space. The twenty-sixth series was on Magnetic Conducting-power:—1. Magnetic Conduction. 2. Conduction Polarity. 3. Magnecrystallic Conduction. Atmospheric Magnetism:—1. General principles. The twenty-seventh series was on Atmospheric Magnetism (continued):—2. Experimental inquiry into the Laws of Atmospheric Magnetic Action, and their application to particular cases.

He gave a Friday discourse on the Electricity of the Air, and another on certain conditions of Freezing Water.

He reported on the adulteration of whitelead for the Trinity House.

To Prof. Schönbein he writes:—"By-the-by, I have been working with the oxygen of the air also. You remember that three years ago I distinguished it as a magnetic gas in my paper on the diamagnetism of flame and gases, founded on Bancalari's experiment. Now I find it in the cause of all the annual and diurnal and many of the irregular variations of the terrestrial magnetism. The observations made at Hobarton, Toronto, Greenwich, St. Petersburg, Washington, St. Helena, the Cape of Good Hope, and Singapore, all appear to me to accord with and support my hypothesis. I will not pretend to give you an account of it here, for it would require some detail, and I really am weary of the subject." Later he writes:—"I think I told you in my last how that oxygen in the atmosphere, which I pointed out three years ago in my paper on flame and gases as so very

magnetic compared with other gases, is now to me the source of all the periodical variations of terrestrial magnetism, and so I rejoice to think and talk at the same time of your results, which deal also with that same atmospheric oxygen. What a wonderful body it is!"

Miss Martineau had said, on the authority of the "Annual Register," that he countenanced the Acarus Crossii. Faraday corrects her:—"I hope you will forgive me for writing to you about this matter. I feel it a great honour to be borne on your remembrance, but I would not willingly be there in an erroneous point of view."

In the summer he was asked by a friend to stay in the country. He writes, August 24, from Upper Norwood:—"I have kept your picture to look at for a day or two before I acknowledge your kindness in sending it. It gives the idea of a tempting place; but what can you say to such persons as we are who eschew all the ordinary temptations of society? There is one thing, however, society has which we do not eschew; perhaps it is not very ordinary, though I have found a great deal of it, and that is kindness, and we both join most heartily in thanking you for it, even when we do not accept that which it offers. I must tell you how we are situated. We have taken a little house here on the hill-top, where I have a small room to myself, and have, ever since we came here, been deeply immersed in magnetic cogitations. I write and write and write until nearly three papers for the Royal Society are nearly completed, and I hope that two of them will be good if they justify my hopes, for I have to criticize them again and again before I let them loose. You shall hear of them at some of the Friday evenings; at present I must not say more. After writing I walk out in the evening, hand-in-hand with my dear wife, to enjoy the sunset; for to me, who love scenery, of all that I have seen or can see, there is none surpasses that of Heaven: a glorious sunset brings with it a thousand thoughts that delight me."

Earlier, the same friend asked him, for the first time, to dinner. He writes from Brighton:—"Your note is a very kind one, and very gratefully received; I wish on some accounts that nature had given me habits more fitted to thank you properly for it by acceptance than those which really belong to me. In the present case, however, you will perceive that our being here supplies an answer (something like a lawyer's objection) without referring to the greater point of principle. I should have been very sorry in return for your kindness to say *no* to you on the other ground, and yet I fear I should have been constrained to do so."

At the end of the year he had another invitation from the Honourable Col. Grey. "If you could make it convenient to come down to Windsor any afternoon in the course of next week, it would give His Royal Highness great satisfaction to have the opportunity of having some conversation with you on this interesting subject (the magnetic properties of oxygen)."

He was made Corresponding Associate of the Accademia Pontificia, Rome, and Foreign Associate of the Academy of Sciences, Haarlem.

Æt. 59 (1851).

The twenty-eighth series of Researches were sent to the Royal Society, on Lines of Magnetic Force, their definite character, and their distribution with a Magnet and through Space; also the twenty-ninth series, on the employment of the Induced Magneto-electric Current as a test and measure of Magnetic Forces.

He gave three Friday discourses on the Magnetic Characters and Relations of Oxygen and Nitrogen; on Atmospheric Magnetism; and on Schönbein's Ozone.

No work is recorded for the Trinity House.

He was made Member of the Royal Academy of Sciences at the Hague, Corresponding Member of the Batavian Society of Experimental Philosophy, Rotterdam; Fellow of the Royal Society of Sciences, Upsala; a Juror of the Great Exhibition.

This year closed the series of "Experimental Researches in Electricity." It began in 1831 with the induction of electric currents, and his greatest discovery, the evolution of electricity from magnetism; then it continued to terrestrial magneto-electric induction; then to the identities of electricity from different sources; then to conducting-power generally. Then came electro-chemical decomposition; then the electricity of the voltaic pile; then the induction of a current on itself; then static induction. Then the nature of the electric force or forces, and the character of the electric force in the Gymnotus. Then the source of power in the voltaic pile; then the electricity evolved by friction of steam; then the magnetization of light and the illumination of magnetic lines of force; then new magnetic actions, and the magnetic condition of all matter; then the crystalline polarity of bismuth, and its relation to the magnetic form of force; then the possible relation of gravity to electricity; then the magnetic and diamagnetic condition of bodies, including oxygen and nitrogen; then atmospheric magnetism; then the lines of magnetic force, and the employment of induced magneto-electric currents as their test and measure.

The record of this work, which he has left in his manuscripts and republished in his three volumes from the papers in the Philosophical Transactions, will ever remain Faraday's noblest monument—full of genius in the conception, full of finished and most accurate work in execution; in quantity so vast that it seems impossible one man could have done so much; and this will appear still more when it is remembered that Anderson's help may be summed up in two words, blind obedience.

The use of magneto-electricity in induction machines, in electrotyping, and in lighthouses are the most important practical applications of the "Experimental Researches in Electricity;" but who can attempt to measure or imagine the stimulus and the assistance which these researches have given, and will give, to other investigators?

Lastly, if we look at the circumstances under which this work was done, we shall see that during the greater part of these twenty years the Royal Institution was kept alive by the innumerable Friday lectures which he gave at it. "We were living" as he once said to the managers, "on the parings of our own skin." He had no grant from the Royal Society, and during the whole of this time the fixed income which the Institution could afford to give him was £100 a year, to which the Fullerian professorship added nearly £100 more.

By the "Experimental Researches in Electricity," Faraday's scientific life may be divided into three parts. The first lasted to 1830, when he was thirty-eight; the second, or "research period," lasted to 1851; and the third and final period began in 1852, and continued to his last report to the Trinity House (in 1865) on the foci and descent of a beam of light 336 feet at St. Bees Lighthouse.

Æt. 60 (1852).

The first and last Friday discourses of the season were on Lines of Magnetic Force. In the "Philosophical Magazine" there was a long paper on the Physical Character of the Lines of Magnetic Force. He begins with a note:—"The following paper contains so much of a speculative and hypothetical nature that I have thought it more fitted for the pages of the 'Philosophical Magazine' than for those of the 'Philosophical Transactions.' . . . . . "The paper, as is evident, follows series xxviii. and xxix., and depends much for its experimental support on the more strict results and conclusions contained in them."

He made many reports to the Trinity house, among others — on adulterated white lead; on oil in iron tanks; on impure olive oils; on the Caskets lighthouse. And the question of the use of Watson's electric light was first moved by a letter of Dr. Watson to the Trinity House.

In October he wrote a long letter to M. De la Rive. ". . . Do not for a moment suppose I am unhappy. I am occasionally dull in spirits, but not unhappy. There is a hope which is abundantly sufficient remedy for that; and as that hope does not depend on ourselves, I am bold enough to rejoice in that I may have it.

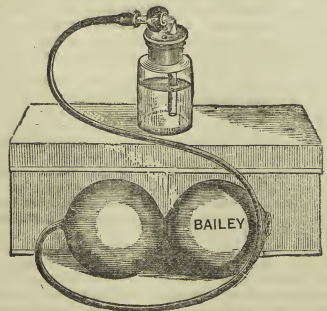
"I do not talk to you about philosophy, for I forget it all too fast to make it easy to talk about. When I have a thought worth sending you, it is in the shape of a paper before it is worth speaking of; and after that it is astonishing how fast I forget it again; so that I have to read up again and again my own recent communications, and may well fear that, as regards others, I do not do them justice. However, I try to avoid such subjects as other philosophers are working at, and for that reason have nothing important in hand just now. I have been working hard, but nothing of value has come of it."

Two months late he writes to Professor Schönbein from Brighton:—

"I am here sleeping, eating, and lying fallow, that I may have sufficient energy to give half a dozen juvenile Christmas lectures. The fact is, I have been working very hard for a long time to no satisfactory end. All the answers I have obtained from nature have been in the negative; and though they show the truth of nature as much as affirmative answers, yet they are not so encouraging; and so for the present I am quite worn out. I wish I possessed some of your points of character; I will not say which, for I do not know where the list might end, and you might think me simply absurd, and, besides that, ungrateful to Providence."

NEW SPRAY PRODUCER, &c., FOR THE APPLICATION OF SULPHUROUS ACID.

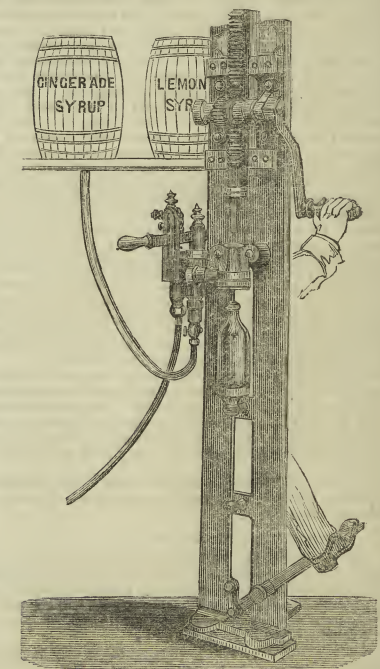
We have on former occasions entered at some length into details of the "Sulphur Cure," as introduced and practised by Dr. Dewar, of Kirkcaldy, and it has been our duty at various times to examine and describe in these columns different forms of apparatus adapted for the inhalation or other application of this much-lauded treatment. A new edition (the fifth) of Mr. Fairman's lively pamphlet, on "The Great Sulphur Cure brought to the Test," has been forwarded to us, and our attention has been still more prominently recalled to the subject by the appearance in the field of Messrs. William Bailey & Son, of Wolverhampton. These gentlemen, well known as very extensive manufacturers of chemicals generally, have lately given considerable attention to the preparation of pure sulphurous acid, with a special view to supply the demand which has been created in medical practice for this remedy through the success of Dr. Dewar and others. On the principle that what is worth doing at all is worth doing well and thoroughly, Messrs. Bailey have now issued a complete outfit for the conduct of the sulphur cure in all its phases, and are prepared to supply the whole world with sulphurous acid and accompanying apparatus. The acid is put up in various sized glass-stoppered bottles for retailing, or in stoppered stone jars for hospital or general



use. Then we have an inhaler made of strong glass, the chief recommendation of which appears to us to consist in its freedom from elaborate design and its consequent comparative cheapness. The Improved Spray Producer, which is shown in the accompanying engraving, is a most useful instrument, and is throughout excellently manufactured. As the makers point out, there are many uses to which the Spray Producer can be applied, as well as for sulphurous acid medication. For gargles, for eye-waters, or for the distribution of perfumes or disinfectants its service is obvious. There is no part of it likely to get out of order, and for this reason it seems well adapted for foreign trade. In Canada particularly we are informed the sulphur treatment has attained much popularity, and colonial druggists will, we think, quickly appreciate the value of these articles.

BAILEY'S SYRUPING AND FLAVOURING MACHINE.

The object of the machine illustrated below is to introduce definite quantities of syrups into bottles of aërated waters almost simultaneously with the operation of filling. The machine is the invention of Messrs. John Bailey and Co., of



Salford, and is supplied by them either in connection with a bottling machine, or separate, ready to be attached to one.

The following description will elucidate the use of the machine. A little piston and cylinder are fastened to the side of the bottling machine, and by suction an exact quantity of syrup is drawn through the pipe connected with a vessel containing it. By the return stroke this syrup is ejected, and at the same moment a valve is depressed, allowing the aërated water to flow into the bottle in the usual manner. Evidently an economy of time is thus gained, together with other advantages which the inventors point out in their advertisement.

WARNER'S SILICATE OF IRON PAINTS.

The gradual abandonment of the paint trade among chemists and druggists, although in many parts of the country it still flourishes with considerable vigour, has appeared to be, like the extinction of the noble savage by the advance of civilization, an almost inevitable consequence of the progress of modern pharmacy. A compromise may, however, be effected by the introduction of Messrs. Warner and Ashby's paints, to which we have pleasure in directing the attention of our readers. These paints are put up in tins, each handsomely labelled indicating the colour, and containing from two to three pounds of paint prepared ready for use. For the customer or the dealer an advantage of cleanliness is thus offered to which neither has been accustomed hitherto. The makers also claim for silicate of iron considerable superiority over lead as a basis for the colours, not only on account of its non-poisonous properties, but also because of its power of resisting heat and damp. We believe Messrs. Richardson and Co. are supplying these paints to the trade.

REVIEWS

An Introduction to the Elements of Pharmacy, or the "Minor and Major Examinations." A Guide to the Principal Points in Materia Medica, Botany, Chemistry, Pharmacy, Prescriptions, and Practical Dispensing. By F. Harwood Lescher, Pereira Medallist. London: John Churchill and Son.

THE book before us has been looked forward to with some amount of eagerness by ourselves and others, as the antecedents and opportunities of its author naturally raised the expectation that he would expend much labour and care on the compilation of a work intended as a guide to the Pharmaceutical Examinations, and prove that his attainments had been duly gauged in the examination room. We are not disappointed. Mr. Lescher has produced a work of considerable value, and one which we do not hesitate to say will prove not only an excellent handbook to the student preparing for examination, but also a most useful companion to every dispensing chemist. Before we proceed to notice briefly the plan of the work and its details, we must be allowed, on behalf of our readers, and particularly of readers of books which do not allow of a hasty perusal, to protest against the innovation of printing the pages laterally, instead of vertically, which necessitates the awkward condition of reading the book at right angles to its normal position. This is the second instance of this arrangement which has come before us lately; and in both cases, we think it would have been preferable to have adopted a wider page—say a similar size to that on which this notice appears, than to have imposed such a tiresome tax on one's comfort and patience.

The Pharmaceutical Examinations (major and minor) comprise six distinct subjects—Materia Medica, Botany, Chemistry, Pharmacy, Translation of Prescriptions, and Practical Dispensing. A reasonable degree of efficiency is required in each of these; and, very properly, the examiners will not allow a perfect mastery of one subject to compensate for an insufficient acquaintance with another. These six branches, then, may be regarded as the necessary limits, as required by law, of the professional education of a chemist and druggist. Mr. Lescher's object in the production of these "elements" has been to provide a map, whereon he has drawn the outlines of each of these divisions of study, and presented the multitude of facts belonging to each in an orderly and sequential manner; and while this work does not and cannot supply the place of more extensive reading, it does very ably accomplish its author's expressed aim—to afford "suggestions to the mind and assistance to the memory." The chapters on Materia Medica classify every officinal and a large number of non-officinal productions, in a clear and complete style, giving the natural order, geographical source, French name, characteristics, and properties of each article. This section is concluded by a chapter on the Adulterations and Substitutions frequently met with in Drugs, and this and a similar chapter in another part of the work, on the Adulterations of Chemicals, we regard as the best parts of the book. We will cite as examples, the first article from each of these chapters, to show the arrangement adopted:—

Drug or Chemical.	Adulteration or Substitution.	Characters. Genuine.	Characters. Spurious.
Opium (Turkey).	(α) Ext. Poppies. (β) Gum, Starch. (γ) Chaff, Dross. (δ) Stones, Shot, Lead. (ε) Inferior qualities, as Egyptian.	Remains good Consistence—granular Colour—Black or reddish, turning to black Odour—Peculiar, but sweet.	Turns mouldy (β). Consistence — Homogeneous, viscid (α, β). Pieces of dross, &c. (γ). Colour — Reddish brown, becomes lighter in colour (ε). Odour—Sour, musty (α) Weight — Unusually heavy (δ).
Sulphur (Precipitated).	Calcium Sulphate (often two-thirds).	Evaporates on application of heat. Microscopic, Granular.	Non-volatile. Crystalline.

We would recommend every student who may obtain this book, and who has a drug store around him, as a most profitable practical exercise, and one which will fortify a very important position against the attacks of the examiners, to go minutely through the chapters we have referred to, and test every drug and chemical there mentioned, taking these promiscuously from stock. The adoption of this plan will not only be satisfactory in commercial result, but will be found also to develop very rapidly the perceptive faculties, and to act as a healthy check on any little inclination towards dishonest profits obtained by a too easy acceptance of reduced prices. It is, of course, chiefly in the study of such a subject as Materia Medica that we appreciate the value of a clear classification of that which we require to know. Pharmacy also fairly comes within reach of the same remark, and hence, in Mr. Lescher's book, we have, under this section, a condensed, but very useful companion to the Pharmacopœia. But science cannot be taught by this means alone. We may shoot down, on any given spot, cart-loads of bricks, but no house will result, unless intelligence be there to arrange and use them; and just so a mere collection of distinct facts can afford no picture to the mind, unless we can trace among these the thread which connects the whole. Mr. Lescher has evidently perceived this, for, both under botany and chemistry, he forbids the assumption that his "Elements" can teach either, unless the student shall have previously acquired a comprehension of the connection of the facts from other sources. The rudiments and principles of these and of all other sciences must be gathered from the study of well-written treatises, and when these are mastered, the accumulation of facts and experiments is, in a sense, almost a mechanical labour, although, of course, essential to advancement. When, therefore, we come to the articles on Structural Botany, and on the Laws of Chemistry, while we admit their usefulness, regarded as statements of the results of study, we can safely challenge the most diligent "crammer" to base his scientific acquirements upon this work alone. We are not sure that anyone could have arranged these subjects better than Mr. Lescher has done; but we are sure that they cannot be arranged at all in a

tabular form to be transferred to the mind of a student as they came from the mind of the teacher. The classification of botany is very clear, and we are much pleased with the tabular arrangement by which the first principles of analysis are exhibited and exemplified, as well as with the chapter on Poisons. The fifth section is on Prescriptions, and shows the application of a few rules of the Latin language to the writing or translation of these. The work concludes with a section on Practical Dispensing, and, though short, contains many points valuable in the memory of a dispenser. Those practised in the art will not unanimously agree with *all* of the author's axioms; at the same time, he has laid down a system which, in its outline, should be the guide of every one who prepares medicines.

Corner for Students.

CONDUCTED BY J. C. BROUGH, F.C.S.

The chemical formulæ employed in this section are based upon the new system of atomic weights, unless the use of the older system is specially indicated. In the *British Pharmacopœia* the symbols corresponding to those adopted here are printed in heavy Clarendon type. The chemical nomenclature generally used in this Corner for Students agrees with that adopted in the new edition of *Fownes's Manual of Chemistry*, which is recommended as a text-book.

PRIZE PAPER.

INSTEAD of giving our usual series of Questions this month, we propose that our students shall occupy their leisure in the preparation of a short but carefully-written original sketch of

THE PHARMACOPŒIA SYSTEM OF VOLUMETRIC ANALYSIS.

The paper should not exceed the length of one of our columns of type. We think that this task will prove a pleasant summer recreation and valuable exercise in the neglected art of composition.

PRIZES.

The FIRST Prize for Solutions of our June Problems is awarded to

W. GREIG, 64, Dundas-street, Monkwearmouth,

who carried off the second prize in August of last year.

The Second Prize is awarded to

J. F. BROWN, 37, Town Wall-street, Dover.

ANSWERS.

[*See Questions in June number, page* 444.]

I. FIRE-DAMP.—961·076 measures of air are required for the complete combustion of the gas.

From the equation

$$\underset{2\text{ vols.}}{CH_4} + \underset{4\text{ vols.}}{O_4} = \underset{2\text{ vols.}}{CO_2} + \underset{4\text{ vols.}}{2H_2O}$$

We conclude that 100 measures of marsh-gas require 200 measures of oxygen for complete combustion, the products being carbon dioxide and steam. Then as the percentage of oxygen in air, by volume, is 20·81, the volume of air corresponding to 200 measures of oxygen is found by the proportion:

$$20{\cdot}81 : 200 = 100 : x\,;\ \therefore\ x = 961{\cdot}076.$$

II. MIXED GASES.—A *mechanical mixture of oxygen and hydrogen* contained in a eudiometer may be exploded by the passage of an electric spark; it cannot be condensed to the liquid state by cold and pressure; a stick of phosphorus slowly but completely absorbs the oxygen, and if the mixture be contained in a graduated tube standing over water, the absorption will be indicated by the rise of the liquid; when colourless nitrogen dioxide (N_2O_2) is introduced into the mixture, it unites with the oxygen to form deep red fumes; a solution of pyrogallic acid in caustic soda or potash is blackened by the free oxygen of the mixture; the mixed gases are not absorbed by sulphuric acid, calcium chloride or phosphoric oxide. The *compound of oxygen and hydrogen* (steam) is not explosive; it is easily condensed to the liquid state; it does not give its oxygen to phosphorus, nitrogen dioxide or pyrogallic solution; it is readily absorbed by sulphuric acid, calcium chloride and phosphoric oxide.

III. IODINE.—The weights of the different products are:

10·981	grammes of hydriodic acid	
1·372	,,	sulphur
9·105	,,	iodine (unacted upon).

The reaction between the iodine and the sulphuretted hydrogen is thus represented:

$$I_2 + H_2S = 2HI + S.$$

Now, by the usual methods of calculation, we find that one litre of sulphuretted hydrogen at 8°C. and 751 mm. becomes 0·960 litre at the standard temperature and pressure. Then as we see by the equation that 22·38 litres of the gas react with 254 *grammes* of iodine, we get the proportion

$$22{\cdot}38 : 0{\cdot}960 = 254 : x\,;\ \therefore\ x = 10{\cdot}895\ \textit{grammes};$$

this being the weight of iodine required for the reaction; consequently 20—10·895 = 9·105, the weight in *grammes* of the *iodine not acted upon*. The weight of *hydriodic acid* produced may be found by the proportion

$$127 : 128 = 10{\cdot}895 : x\,;\ \therefore\ x = 10{\cdot}981\ \textit{grammes}.$$

The weight of *sulphur* precipitated is found thus,

$$22{\cdot}38 : 0{\cdot}960 = 32 : x\,;\ \therefore\ x = 1{\cdot}372\ \textit{grammes}.$$

IV. HYDROSTATIC TOY.—The air contained in the upper part of the vessel being elastic is diminished in volume by the pressure on the membrane; the water being practically incompressible communicates the external pressure to the air in the little balloon and rises within it. The balloon when containing both water and air is heavier than the volume of water which it displaces, and accordingly it sinks. When the external pressure is removed the elastic air expels the water from the balloon; but when it is filled with air only the balloon is lighter than an equal volume of water, and consequently it ascends.

V. STEAM.—The density of steam at 200°C. and the standard pressure is 5·1945, the density of hydrogen being taken as unity.

From the formula H_2O we learn that the theoretical density of steam at 0°C. is 9. Then as 273 volumes of gas or vapour become 273 + 200 at 200 C. the density of steam at that temperature is found by the proportion

$$473 : 273 = 9 : x\,;\ \therefore\ x = 5{\cdot}1945.$$

VI. AMMONII BROMIDUM, *B.P.*—The object of the starch test is to insure the absence of iodides.

VII. AMMONII CHLORIDUM, *B.P.*—The weight of the salt obtained would be 7970·87 grs.

According to the Pharmacopœia 1 fluid drachm of Liq. Ammon. Fort. contains 15·83 grains of NH_3; therefore, 1 pint will contain 15·83 × 160 = 2532·8 grs. As 17 grs. of NH_3 are equivalent to 53·5 grs. of ammonium chloride, the weight of this salt left after evaporating 1 pint of the solution with hydrochloric acid, will be found by the following proportion:—

$$17 : 2532{\cdot}8 = 53{\cdot}5 : x = 7970{\cdot}87.$$

VIII. COLOURS.—

Chrome yellow	—	lead chromate	$Pb\,Cr\,O_4$
Red lead	—	triplumbic tetroxide	$Pb_3\,O_4$
Scheele's green	—	copper arsenite	$Cu_2\,As_2\,O_5$
Prussian blue	—	ferric ferrocyanide	$Fe_7(CN)_{18} + 18aq.$
Flake white	—	lead carbonate	$Pb\,CO_4$
Pearl white	—	bismuth oxynitrate	(Doubtful)
Zinc white	—	zinc oxide	Zn O
Vermilion	—	mercuric sulphide	Hg S
Brunswick Green	—	copper oxychloride	(Doubtful)

IX. SOLUTION OF CHLORIDE OF TIN.—In this process stannous chloride is formed and hydrogen liberated, thus:

$$Sn + 2HCl = SnCl_2 + H_2.$$

The solution is kept in contact with tin to prevent its decomposition under the influence of the atmospheric oxygen.

X. SODÆ ACETAS, *B.P.*—Sodium acetate may be readily made by mixing sodium carbonate with acetic acid in slight excess and evaporating the solution until it solidifies on cooling. If necessary, the salt may be purified by re-crystallization.

Marks awarded for Answers.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	E.	Total.
W. Greig (*1st prize*) ..	6	6	9	5	6	3	7	7	4	4	7	64
J. F. Brown (*2nd*) ..	6	6	8	5	6	3	7	7	3	4	7	62
J. W.	6	7	7	4	4	3	7	7	3	4	5	57
J. A. Kendall ..	6	5	9	4	0	3	7	7	4	4	7	56
W. Lucas	6	6	8	6	0	3	7	6	4	4	5	55
J. C. Thresh	6	7	0	5	6	3	7	7	4	4	6	55
A. Fraser	6	6	9	5	0	3	4	7	4	4	6	54
J. Trehaune	0	7	9	5	6	3	2	7	3	4	6	52
Solus	6	7	0	6	0	3	7	7	4	4	6	50
H. Habgood	6	5	0	4	6	3	7	6	3	4	5	49
J. D. D. Thomas ..	6	5	0	5	0	3	7	6	3	4	5	44
J. Tully	6	5	0	5	0	3	7	7	3	4	4	44
J. A. Findlay	6	8	0	6	0	3	3	7	3	4	3	43
Edina	0	7	0	4	0	3	7	7	4	4	5	41
J. Paulin	6	7	0	4	0	3	2	6	3	4	5	40
W. J. Smith	0	5	0	5	6	3	2	7	3	4	3	38
A. Z.	4	5	—	4	—	3	—	5	3	3	0	27
T. C. White	0	5	—	5	—	—	—	6	—	—	0	16
Contentus	—	—	—	5	—	—	—	5	—	4	0	14

Books offered as First Prizes.

Attfield's *Introduction to Pharmaceutical Chemistry.* (Van Voorst.)
Brooke's *Elements of Natural Philosophy.* (Churchill.)
Conington's *Handbook of Chemical Analysis;* with Tables of Qualitative Analysis adapted to the same. (Longmans.)
Eliot and Storer's *Manual of Inorganic Chemistry.* (Van Voorst.)
Fownes's *Manual of Elementary Chemistry, Theoretical and Practical* (Churchill.)
Fresenius's *Qualitative Analysis.* (Churchill.)
Ganot and Atkinson's *Elementary Treatise on Physics.* (Longmans.)
Garrod's *Materia Medica;* with Modern Chemical Notation. (Walton.)
Noad's *Chemical Analysis, Qualitative and Quantitative.* (Reeve.)
Northcote and Church's *Qualitative Analysis.* (Van Voorst.)
Royle and Headland's *Materia Medica.* (Churchill.)
Williamson's *Chemistry for Students.* (Clarendon Press)

[Any other scientific book that is published at a price not greatly exceeding half-a-guinea may be taken as a first prize.]

Books offered as Second Prizes.

Barff's *Introduction to Scientific Chemistry.* (Groombridge).
Bloxam's *Laboratory Teaching.* (Churchill.)
Church's *Laboratory Guide for Students in Agricultural Chemistry.* (Van Voorst.)
Galloway's *First Step in Chemistry.* (Churchill.)
Hofmann's *Introduction to Modern Chemistry.* (Walton.)
Huxley's *Lessons in Elementary Physiology.* (Macmillan.)
Oliver's *Lessons in Elementary Botany.* (Macmillan.)
Potts's *Elements of Euclid.* School Edition. (Longmans.)
Roscoe's *Lessons in Elementary Chemistry.* (Macmillan.)
Wurtz's *History of Chemical Theory.* Translated by Watts. (Macmillan.)
Wurtz's *Introduction to Chemical Philosophy.* Reprinted from the "Chemical News."

[Any other scientific book which is sold for about five shillings may be taken as a second prize.]

MANCHESTER CHEMISTS' AND DRUGGISTS' ASSOCIATION.

Distribution of Prizes.

At the conclusion of the Pharmaceutical Courses, the following prizes were awarded in the Chemistry and Materia Medica classes:—

Chemistry.

First prize, books to the value of three guineas, given by Mr. Woolley, to Mr. Taylor, with Mr. Slugg, Manchester. Second prize, books to the value of one guinea, given by Messrs. Mottershead and Co., to Mr. Wheelee, with Mr. Wheeldon, Manchester.

Materia Medica.

First prize, a microscope, given by Mr. Councillor Brown, to Mr. Yeats, with Messrs. Lynch and Bateman, Manchester. Second prize, books to the value of one guinea, also given by Mr. Brown, to Mr. Butterworth, with Mr. Gibbons, Manchester.

Pharmaceutical Courses, 1869-70.

In accordance with the scheme proposed by this Association, the authorities of Owen's College, Manchester (in connection with the University of London) have again arranged courses specially adapted to prepare students for the examinations required, under the Pharmacy Act, to be passed before persons can commence the business of Chemist and Druggist:—

1. The Session in all the Evening Classes will commence on Wednesday, the 6th October, 1869, with an introductory address, open to the public, to be given in the Library of the College, at 7.30 pm.

2. *New Students* will be admitted by the Principal on Thursday, the 7th, and Friday, the 8th October, from 6.30 to 8.30 p.m. *Former Students* can re-enter with the Registrar, on Monday and Tuesday, the 11th and 12th October, from 6.30 to 8.30 p.m. Students entering after the above dates must apply to the Principal if new students, or to the Registrar if former students, from 12.30 to 2 p.m. on any day of the week except Saturday. Former students may also re-enter with the Sub-Librarian on any subsequent evening, except Saturday, during the month of October.

3. New students are required to produce a letter of recommendation from their employers, or such other testimonial as shall be approved by the Principal.

4. Intermediate examinations will be held in most of the classes at the commencement of the Christmas Term, and sessional examinations at the end of the courses; on the results of the latter Prizes and Certificates of Honour will be awarded.

5. Each of the Pharmaceutical courses will comprise 27 lectures. The fees (to be paid on entrance) are as follows:—

	£	s.	d.
Admission Fee for each new student ...	... 0	2	6
Each Lecture Course	... 0	15	0
Any Three of the Lecture Courses ...	... 2	0	0
The Four Lecture Courses	... 2	10	0
The Laboratory Course (the use of all the necessary apparatus and chemicals included)	... 4	4	0

The Courses of Instruction for this Session are—

I. *Latin.*—Mr. Augustus S. Wilkins, M.A.; Mr. Arthur G. Symons, B.A. Monday, from 7.30 to 8.30 p.m. Latin Grammar. Cæsar, "De Bello Gallico," Book I. Two classes will be held should the number and varying attainments of the students require it.

II. *Chemistry.*—Professor H. E. Roscoe, B.A., Ph.D., F.R.S., F.C.S.; Mr. C. Schorlemmer, F.C.S. Monday, from 8.35 to 9.35 p.m. The first portion of the course, consisting of about 20 lectures, will be given by Professor Roscoe, and will treat of the elementary principles of Chemical Science, and the nature and properties of the Non-Metallic Elements and their compounds. The second portion of the course will be given by Mr. Schorlemmer, and the subjects treated of will be the Characters and Tests of the most important Metallic Salts and Organic Substances used in Pharmacy, and the methods of ascertaining their purity and strength.

Laboratory Course of Practical Chemistry.—Monday, from 6 to 8.30 p.m. This class is intended for those students who have already passed through the lectures on Elementary Chemistry, or who have otherwise made themselves acquainted with the principles of the science. The course of instruction will embrace,—The construction of tube apparatus. The preparation of some of the most important gases, acids, and bases, and the study of their properties and characteristic reactions. The characters and tests of the most important chemical substances used in Pharmacy, and the methods of ascertaining their strength. The tests for poisons, organic and inorganic. The mode of separation of the groups of Elementary Bodies forming the groundwork of Qualitative and Quantitative Analysis. Each student will make the experiments separately.

III. *Botany.*—Professor W. C. Williamson, F.R.S. Wednesday, from 7.30 to 8.30 p.m. The Anatomy and Physiology of Plants. Elementary Tissues. Compound Organs of Nutrition and Reproduction. Principles of Classification. Systematic Botany.

IV. *Materia Medica.*—Mr. Alexander Somers, M.R.C.S. Wednesday, from 8.35 to 9.35 p.m. Inorganic Substances.—Non-metallic elementary substances, mineral waters, acids, and the products of fermentation. Salts of the metals. Organic Substances.—Vegetable. Animal.

At the request of the Council of the Manchester Chemists' and Druggists' Association, Prof. Williamson will this year give a short Summer Course of twelve Lectures on Botany to their Members and Associates. The course will be elementary and preparatory to the more extended Winter course. The lectures will be given at the College on Thursday afternoons, from 4 to 5 p.m., commencing on the 10th June, 1869. Tickets may be obtained from Mr. F. Baden Benger, Hon. Secretary of the Association, 1, Market-place, Manchester.

A detailed Syllabus of the several Courses of Lectures for the Session 1869-70, and of the Scholarships and Money Prizes open to Evening Students, together with the Principal's Report, the Examination Questions, and the Prize List for the preceding Session, may be procured, price 6d. (by post 7d.), from the publishers, Messrs. Thos. Sowler and Sons, Red Lion-street, St. Ann's-square, from J. E. Cornish, 33, Piccadilly, or at the office of the College, Quay-street, Manchester.

J. G. Greenwood, Principal.
J. Holme Nicholson, Registrar.

[By a strange error of the press, the *Pharmaceutical Journal* connects the Nottingham and Nottinghamshire Chemists' Association with the Pharmaceutical Courses of Owen's College, Manchester.]

CHEMICAL SOCIETY.

THE FARADAY LECTURE.

The first Faraday Lecture, delivered before the Chemical Society, on Thursday week, at the Royal Institution, presented several remarkable features. The Council chose for this purpose a Frenchman, M. Dumas, the great chemist, who gave up his time to this duty, and whose address to a large English audience was given in his native tongue. Dr. Williamson, the President, thought it was a fitting commemoration of Faraday, that a most intimate friend and associate in the great world of science should represent the catholicity of his discoveries. It was in this spirit M. Dumas accepted it; and from that place, so often occupied by Dr. Thomas Young, Davy, and Faraday, Dumas proceeded to deliver his discourse. What the nature of it was to be no one knew, nor from the beginning could any tell whether it was to be a formal *éloge*, or how it was to shape itself. After a few remarks on the nature of the individual discoveries of Faraday, he preceeded to observe that these discoveries connected themselves with four great topics, the nature of inorganic matter, and the nature of the forces by which it is operated upon; the nature of organic matter, and the nature of the forces operating on this matter. These were problems which had occupied the ancient world, and particularly the great Greek philosophers; and he maintained that in substance our real and ultimate knowledge was in the same state as that of the Greeks, and went no further. In rendering a tribute to Aristotle and his fellows, he affirmed that Faraday had approached all those subjects in the spirit of a Greek philosopher. He described what Faraday, and more particularly Dalton and other Englishmen, had done to show the identity of the matter; and he avoided all reference to foreign philosophers, except, as it were on compulsion, to Lavoisier. He went on to detail the means by which Faraday had proved the identity of forces, and their relation to that of gravitation; but he affirmed that of this ultimate force we know no more than Aristotle did, and that the knowledge of it rested with One above. By this time it was perceived that the oration of M. Dumas, delivered with the ease and grace almost of an improvisation, and assuredly with the gifts of, a refined orator, was a vindication of natural science in the sense of immaterialism and in the spirit of Faraday. Proceeding to organic matter, he described the way in which modern chemistry had succeeded in multiplying the combination of its forms, and imitating with inorganic elements organic substances. He referred to the influence of solar heat and light in the development of the organic world, and to the dispersion of the constituents of these into that infinite space, the elements of which we know to be the same as those of this globe. He denied, however, that the chemist with all his endeavours had ever imitated life itself, or would ever be able to produce a living being. There must be a living seed for a living plant, and a living egg to produce a living animal. These, he said, were something beyond, far above human power, and within the power of God alone. That was the spirit, the orator affirmed, in which these great subjects had been regarded by Faraday, and he believed it was in that spirit the audience there assembled had met to commemorate Faraday. They did not believe that all of Faraday lay beneath the cold gravestone. He was there among them, sharing in their thoughts, for if he had not believed in the immortality of mind above matter he would never have laboured for the benefit of science and the advancement of the human race.

M. Dumas ended with applause. He was listened to throughout with attention by a crowded audience; applause alone had interrupted him, and that sometimes with untimely zeal. He had aroused the enthusiasm he felt; and with the unanimous thanks of all, touchingly proposed by Prof. Tyndall, the spectacle of the defence of immaterialism by a *savant* of France before an English audience, was closed. In returning thanks for the attention shown him, M. Dumas expressed his hope that the example of that day would be imitated elsewhere. He wished to hear his English brethren in Paris, and at all events the Centenary of Lavoisier in 1872 would afford a fitting opportunity. He also applauded the idea of the Chemical Society in devoting this celebration to Faraday; for, he said, Academies had too often bestowed their attentions on princes and statesmen, but in this instance with far greater propriety, for Michael Faraday was a prince in intellect and a power in the realms of science.—*Athenæum*.

NITRO-GLYCERINE.

The passage of this dangerous fluid through the streets of Liverpool, and its shipment at that port, came before the Mersey Docks and Harbour Board on the 8th inst. It was stated that the nitro-glycerine which so lately exploded at Carnarvon was shipped direct from Hamburg, and that large quantities of it were continually being imported into Liverpool. It transpired that there was no provision whatever in the Docks Act to prevent the shipment of such dangerous compounds; but that if such articles were shipped, and were not distinctly marked "specially dangerous," the shipper could be prosecuted, and, if found guilty, fined in a sum of £500, and in default to be imprisoned for two years, with hard labour. One of the members looked at the passage of such dangerous articles through Liverpool with horror. It was used in large quantities in all the South American mining districts, and no expense was spared to secure its export from Liverpool. It was suggested that the Board should go to Parliament for an Act—such as the Gunpowder Act of 1865—to prevent the passage of nitro-glycerine through the streets.

On Monday, the 12th instant, Mr. Robert Humphreys, manager of the Enamelled Slate Works, Carnarvon (of which Messrs. Webb and Cragg, agents for nitro-glycerine, and proprietors of that which lately exploded at Cwm-y-glo, are part owners), was summoned before the Mayor (Mr. L. Turner) and Mr. Thomas Turner, charged with keeping on his premises, near the railway station, Carnarvon, a dangerous and explosive substance called dynamite, the premises not being duly licensed for the purpose. Mr. Orlando Webb, owner of the dynamite and of the nitro-glycerine, gave evidence that dynamite was not explosive unless it had a percussion cap of strong fulminate powder applied to it. Sergeant-Major Howells described an experiment made on a cask of it in 1868, when Mr. Webb and others were present. The cask was shot at, and on a second occasion it exploded with terrific force. The Chief Constable prosecuted, and Mr. Louis, Ruthin, defended. The magistrates, in acquitting the defendant on this occasion, declined granting a certificate prohibiting further investigation, which it is understood the Chief Constable intends to proceed with.

PRICE'S PATENT CANDLE COMPANY (LIMITED).

The following circular was issued on June 18th:—

"The publication of the notice of the 14th inst., convening an extraordinary general meeting of the Company on July 1, in pursuance of a requisition signed by certain shareholders, to take into consideration the present state of the Company's affairs, and to propose or adopt such measures as may seem most advisable under the circumstances, has naturally produced a feeling of great alarm in the minds not only of the shareholders, but of many persons having large commercial transactions with the Company. At the time when that notice was issued, the board had not received any intimation of the object of the requisitionists in convening the meeting, or of the nature of the proposals to be submitted to it, but they have since received notices from three

of the requisitionists—Dr. Parkin and Messrs. Ward and Smith—of their intention to propose to the meeting the adoption of the subjoined resolutions. These are the only notices which have been given to the directors. The board hasten to communicate these facts, in order to allay as speedily as possible the fears necessarily felt by the shareholders. They leave the shareholders to judge of the necessity, or even propriety, of convening an extraordinary general meeting, by a requisition, couched in such sweeping and alarming terms, for the purpose of bringing forward three proposals, one of which—that relating to the writing down the profit and loss old account—has been submitted to every ordinary general meeting since 1864; and another—that relating to the participation of the workers in profits—was submitted to the last two ordinary general meetings. The payment of the travellers, to which the third proposal relates, is a matter which the shareholders will probably think may, without impropriety, be left to the judgment of the board and manager. The directors are most anxious to spare the shareholders all unnecessary trouble in attending the meeting, and therefore they enclose a proxy paper, most earnestly entreating every shareholder who does not intend to be present to sign a proxy, and send it at once to the secretary, in order to support the board, whose only desire is to conduct the Company's business in the manner most conducive to the interests of the shareholders."

The resolutions proposed by Dr. Parkin are as under:—

"1. As the resolution of last year, assigning to the *employés* and workpeople of the Company one-third of all the net profits above £30,000, has been considered by a large number of the shareholders to be unjust and impolitic, and by others illegal, it is proposed that the same be now rescinded, more especially as the measure has not yet been brought into actual operation. And it is further proposed, with the view of preventing such a result again, that no assignments of the profits, either to our *employés* or our workpeople, shall in future be made without the assent of at least two-thirds of the shareholders.

"2. As it is desirable, regard being had to the present low rate of the Company's dividends, that the net profits shall no longer be applied to the writing down the account termed profit and loss old account, it is proposed that this account be now closed, and that the balance, amounting on December 31, 1868, to £36,581 1s., be carried to the suspense account."

The resolution proposed by Messrs. F. O. Ward and J. H. E. Smith is:—

"That our travellers be henceforth paid by commission, on the amount of the realised proceeds of the sales effected by each, instead of, as at present, by a fixed salary, without reference to their activity or the reverse."

ACCIDENTS.

DEATH FROM DRINKING VITRIOL.

An inquest was held at Leeds, on the 28th ult., on the body of a boy named John Gill. It appeared that the deceased went with his mother into the house of a neighbour, named Kay, a dyer, who was using some oil of vitriol in a back yard, to which access could only be had through the house. Unobserved by anyone, the child rambled into the yard, and taking up the bottle containing the vitriol, drank a portion of the contents. His screams brought assistance, but the child's injuries were of so dreadful a character that death soon terminated his sufferings.

DEATH FROM CHLOROFORM.

Mr. John Edward Perris, chemist and druggist, Ross, Herefordshire, was found dead in his bed, on the 20th ult., at the Swan hotel. At the inquest, on the following Tuesday, it transpired that the deceased had been in the habit of inhaling chloroform for the purpose of lulling the pain attendant upon a disease of the spine, from which he had long suffered; and that, owing to the presence of scarlatina amongst his children, he had taken a bedroom at the Swan hotel. During the previous week he had complained of a slight illness, but his conduct had never excited the suspicion that his mind was in any way deranged, or that he contemplated committing suicide. The evidence of the "boots" at the hotel, who was the first to discover that Mr. Perris was dead, was consistent with the supposition that the deceased had saturated his handkerchief with chloroform, and had accidentally inhaled sufficient vapour to occasion sudden stupefaction, for his hands were found with the handkerchief between them, resting upon the pillow close to his face. The other evidence taken showed that, although the deceased had long been habituated to the use of chloroform, he had never taken it for any other purpose than that of alleviating pain. The jury found that the deceased died from the effects of chloroform taken by inhalation to alleviate pain.

GOSSIP.

The guardians of the Sheffield Union have accepted the tender of Mr. Carr for the supply of drugs at £54 17s. 6d.

The late Dr. Mackay has bequeathed the munificent sum of £2,000 to the Greenock Hospital and Infirmary.

Mr. Fernley, chemist and druggist, of the Tything, has been appointed to supply drugs, etc., to the Worcester Union for the next six months.

The tender of Mr. Bowater, of Walsall, for the supply of olive oil to the union at 5s. 3d. per gallon, has been accepted; and the tender of Mr. Sneyd, for trusses, has also been accepted, double at 2s. each, single 1s. 6d. each.

The annual meeting of the Birmingham branch of the British Medical Association was held on the 25th ult. Mr. J. Vose Solomon presided, and in his address referred to the great club question.

A new blasting powder, called ammoniac powder, has been introduced into Sweden with successful results. The Prussian newspapers speak of it as being superior to dynamite, nitro-glycerine, and other explosives of that nature.

On the 28th ult., Mr. Francis Smith, manager of the Friar's Goose Chemical Works, Newcastle, was presented with a pair of gold spectacles by the clerks, and a handsome gold watch guard and appendages by the foremen and workmen, as a mark of the respect and esteem in which he was held on the occasion of his leaving the works.

Some indefatigable members of the "long firm," named Maxwell and Tate, are favouring the tradesmen of Stamford with orders. Mr. Wilson, chemist, received an extensive order for cake, but he was too wise to execute the order without making inquiries. One firm has received an order for 2 cwt. of linseed and 2 cwt. of white lead, whilst another has been honoured with an order for 36 gallons of paraffin.

The South Staffordshire Exhibition, which was opened at Molyneux House, Wolverhampton, by the Earl Granville, on the 11th May, has been very successful. The principal exhibits interesting to our readers are the samples of soda and ammonia salts, shown by Messrs. Chance Brothers and Co., of Oldbury, and the specimens of chlorate of potash and phosphorus, in the case exhibited by Messrs. Albright and Wilson, of Oldbury. Messrs. Mander Brothers, of Wolverhampton, exhibit a case of varnishes and gums, which reflect great credit upon this important Midland house.

Bean Feasts.—There is perhaps no more effectual way of keeping up kindly relations between employers and employed, than the custom now adopted by many large firms of giving an annual holiday, or "bean-feast" as it is called, to all the hands in their employ. People who are in a position to take a trip into the country whenever they are so disposed can have but little idea of the pleasure with which the hard-worked artizan looks forward to this day, as perhaps the only one throughout the year on which he can get a sight of a green field, and sniff the pure, fresh, country air. Possibly, too, the expectation of a good dinner may contribute to his anticipations of enjoyment; but we apprehend that in this respect he differs very little from many who style themselves his "betters." In some factories the men are allowed to solicit other houses for subscriptions towards their treat, but we cannot regard this practice otherwise than as a most objectionable one, alike degrading to the employers and annoying to the parties solicited. The real value of a "bean feast" lies in its being a spontaneous act of liberality on the part of the employers, and thoroughly understood to be so by the men themselves.

This principle has been for many years acted upon by the Patent Plumbago Crucible Co., at Battersea, who gave their annual treat to the men in their employ on Saturday the 3rd inst. The place selected for the occasion was the Old Welsh Harp, at Kingsbury, where a capital dinner had been provided by the obliging landlord, Mr. Warner, in a large tent on the bowling-green. It is scarcely possible to imagine a better locality than this for such an entertainment; tastefully-laid-out gardens, cricket ground, shooting gallery, boating and fishing, furnishing abundance of out-door amusement, whilst the accomodation in-doors is equally adapted to the contingency of a "rainy day." The band belonging to the Plumbago Works performed in a very creditable manner at intervals throughout the afternoon, and the party returned home at a late hour, highly gratified with their day's outing.

Trade Memoranda.

Two clerical errors occurred in our report of the Pharmaceutical *conversazione* last month which we are desirous to correct. The Soda Water Machine described as *Grant's* should have been "*Geraut's*," being that noticed in the May number of this journal; while Mr. Balmer's Extract of Belladonna was credited to an unknown chemist of the name of "Reisman." The word should have been "resinous."

We understand that one of Messrs. Dows, Clark, and Van Winkle's Ice Cream Soda Water Apparatus has been bought by a Moscow firm, expressly for the great fair of Nijni Novgorod. This is the great annual gathering to which the Eastern World repairs, accompanied by a large proportion of his wives and families.

GAZETTE.

BANKRUPTS.

CLIFTON, ROBERT, veterinary surgeon, Tattershall.
DENNISON, JOSEPH, bonesetter, Penrith.
FIRMIN, G. J., chemist, Montague-street, Whitechapel.
GREEN, JOHN, surgeon, Kingston on-Hull.
HARRISON, T. M., veterinary surgeon, Thirsk.
PARKES, HENRY, ginger-beer manufacturer, New Accrington.
ROBERTS, ROBERT, druggist, Llanrwrst.
WATTS, J. T., chemist, Portland.

PARTNERSHIPS DISSOLVED.

ATKINSON and WALSH, Stamford-street, Blackfriars-road, surgeons.
BALY and BALY, druggists, Warwick.
BUSBY and MARRIOTT, Leamington Priors, surgeons.
CANNING and KEATES, druggists, Birmingham.
DALTON and ROOKE, surgeons, Cheltenham.
FAY and DAVIDSON, Norton Folgate, chemists.
GOODCHILD and WETHERHEAD, Kentish-town-road, chemists.
HALL, SEN., and HALL, jun., Darlington, druggists.
HUMBY, WEBB, and GRIGG, Edgware-road, surgeons.
LEE and LIVERSEDGE, manufacturing chemists, Leeds.
MESSER, MESSER, STACEY, and WRIGHT, Poultry, chemists (so far as regards Josiah Messer and Frederic Messer).
MESSER, MESSER, and STACEY, High Holborn, chemists.
PEARSE and HALL, Camborne, druggists.
RICHARDSON and PARSONS, Leicester, druggists.
STONE and WEBBER, Crew's-hole, Gloucester, manufacturers of chemicals.
THORNLEY, sen., KNIGHT and Co., Birmingham, manufacturers of varnish (so far as regards Joseph Knight).
WALLINGTON, SWINBORNE, and Co., Upper Thames-street, isinglass manufacturers (so far as regards James Wallington).

SCOTCH SEQUESTRATIONS.

FITCH, SAMUEL HILL, and HARRISON, GEORGE COOPER, Camlachie, near Glasgow, chemical manufacturers.
HARRISON, GEORGE COOPER, Camlachie, near Glasgow, chemical manufacturer.

Notes and Queries

PETROLEUM ACT. *E. Capper* (Bath).—The amended Act has not yet become law, but, according to the copy printed in our June number, small bottles of Benzine Collas and similar liquids may be sold without licence, provided they bear the authorised caution label. The Act is not likely to undergo further modification, and it will probably be printed before the end of the month.

STICKY FLY-PAPERS. *T. Deighton* (Bridgnorth).—According to Mr. Cooley, these offensive fly-papers are prepared by coating the surface with factitious bird-lime, which is made by boiling linseed-oil, either with or without a little yellow resin, until it forms a viscid, stringy paste when cold.

POISONS. *S.*—Dr. Taylor's treatise "On Poisons," published by Churchill, price 12s. 6d., is the most comprehensive work; but we are afraid that it has not been recently revised.

PHARMACY ACT.—*A Subscriber, I. J. B.*—The Pharmacy Act Amendment Bill has not yet passed. We will answer your queries when we see the amendments.

YEAST POWDERS.—These are sometimes formed from 2 parts of cream of tartar and 1 part of bicarbonate of soda.

TO BLEACH SPONGES.—Remove the sand by shaking; wash the sponges in hot water, and press as dry as possible. Then place in a bath of dilute muriatic acid for half an hour; remove from bath, and after washing well in hot water, place in a bath of fresh acid, to which has been added 6 per cent. of hyposulphite of soda, and allow it to remain for twenty-four hours. The sponge is then finished by washing in water and drying.—*American Druggists' Circular.*

AN INSECTIFUGE.—"Omega," in the *Lancet*, recommends a parish doctor to place a few drops of the solution of chlorinated soda upon his linen before visiting his patients.

SUBSTITUTE FOR COPPER IN THE DANIELLS BATTERY.—We extract the following note from an American journal: Few persons, in experimenting upon voltaic combinations, ever consider economy in their construction, and experiments which tend to cheapen their first cost should be made public. An expensive part of the Daniells battery is the copper plate, the cost of which can be reduced two-thirds, in the following manner: Procure sheets of the ordinary sheet tin of commerce, brighten, and plunge into a very weak copper plating solution, in connection with a voltaic battery of very low quantity. In fifteen to eighteen hours a tenacious film of copper will have been deposited upon the tin, and the plate can then be bent in shape suitable for a Daniells battery.

Two correspondents have inquired where tallow can be bought at the price mentioned in our Prices Current. A reference to that column will show that the quotation is for Tallow Oil, and, we need hardly add, is the market value, and not the price at which it is offered by any particular firm.

Mr. D. R. Brown (Edinburgh) and Mr. Henry Bray (Masboro') are thanked for their polite communication.

Patent List

[The following list has been compiled expressly for the CHEMIST AND DRUGGIST by L. de Fontainemoreau, Patent Agent, 4, South-street, Finsbury, London; 10, Rue de la Fidelité, Paris; and 33, Rue des Minimes, Brussels.]

Provisional Protection for six months has been granted for the following:—

No.
329. A. S. and A. R. Stocker, Glass Manufacturers, both of Lamb's Conduit Works, Artillery-street, Horsley-down. Improvements in caps or stoppers applicable to, and the employment of them with, feeding and other bottles. Dated 3rd February, 1869.
1539. W. R. Lake, of Southampton-buildings, Chancery-lane. An improved process for obtaining gelatine and other products from animal substances. Dated 19th May, 1869.
1632. F. A. Barrow, of Glasgow, Drysalter and Commission Agent. Improvements in purifying or bleaching mineral oils. Dated 27th May, 1869.
1642. J. Brönner and H. Gutzkow, both of Frankfort-on-the-Maine, Prussia. An improved method of obtaining anthracen out of asphaltos, that is to say, pitch produced from coal tar, and of preparing two colouring matters from the anthracen. Dated 28th May, 1869.
1678. W. E. Newton, of Chancery-lane. A novel device for locking corks or stoppers in bottles and other necked vessels. Dated 31st May, 1869.

1706. H. Larkin, of 6, Torriano-cottages, Leighton-road, and W. White, of 30, Thurlow-road, Hampstead. Improvements in the manufacture of magnesium, and in the preparation of its anhydrous chloride. Dated 2nd June, 1869.

1710. A. L. Simpson, of Stowmarket, Suffolk, Pharmaceutical Chemist. Improvements in compositions suitable for treating sheep attacked by fly, and for destroying the maggot, and for other similar purposes. Dated 2nd June, 1869.

1719. W. V. Morgan, of Cannon-street, Merchant. Improvements in the manufacture of crucibles and other refractory articles or vessels. Dated 3rd June, 1869.

1734. F. Lewis, of Dublin, Manufacturing Perfumer. Improvements in bottles or vessels for perfumes, medicines, and other liquids, and in the stopper of such bottles or vessels. Dated 4th June, 1869.

1742. T. W. Arkle, of Liverpool. Improvements in the mode and means for extracting, recovering, or collecting copper from water containing the same in solution, and in apparatus therefor. Dated 5th June, 1869.

1744. F. H. Holmes, of Mortlake, Surrey. Improvements in electro-magnetic machines. Dated 5th June, 1869.

1775. R. Roberts, of the Haulgh, Little Bolton, Lancaster, General Agent. Improvements in mechanical and artificial dentistry. Dated 9th June, 1869.

1786. W. Chambers, of the United University Club. Improvements in refrigerating and ventilating carriages, trucks, or other moveable or fixed apparatus used for conveying or stowing animal or vegetable substances of a perishable nature. Dated 9th June, 1869.

1800. G. W. Oliver, of Liverpool, Merchant. Improvements in the manufacture of explosive powder, and in machinery to be used in such manufacture. Dated 10th June, 1869.

1809. A. Lafargue, of 10, Park-road, Newcastle-on-Tyne, Engineer. Improvements in apparatus for weighing and registering. Dated 12th June, 1869.

1818. J. Taylor, Engineer, of 27, Russell-street, Bermondsey-street. A floating and sliding top for wells, tanks, cisterns, or any other kind of vessel for keeping or holding water, fermented or unfermented, or any other kind of liquor. Dated 14th June, 1869.

1832. W. Smith, of Bathgate, Linlithgow, Chemist. Improvements in treating or purifying mineral oils. Dated 15th June, 1869.

1840. J. T. Masbon, of 2, Rue St. Eppoline, Paris, Mechanic. Improvements in apparatus for carrying invalid, wounded, sick, and other persons. Dated 15th June, 1869.

1850. G. W. Fox, of Manchester, Colliery Furnisher. Improvements in the treatment of castor, cod-liver, and other medicinal oils in order to render the same more palatable. Dated 16th June, 1869.

1868. W. R. Lake, of Southampton-buildings, Chancery-lane. An improved process for preparing sulphates and obtaining fine silver therefrom. Dated 17th June, 1869.

Letters Patent have been issued for the following:—

3691. J. H. Johnson, of Lincoln's-inn-fields. A new mode of, and apparatus for, treating diseases. Dated 4th December, 1868.

3714. A. M. Clark, of Chancery-lane. A new or improved chemical compound for the disinfection and treatment of sewage and other liquid and solid matters. Dated 5th December, 1868.

3775. J. Millward, of Birmingham, Civil Engineer. Improvements in preserving meat and animal matter, and in apparatus employed for that purpose. Dated 12th December, 1868.

3780. Z. Poirier, of 2, The Grove, South Lambeth, Merchant. A new or improved safety stopper for bottles and other vessels. Dated 12th December, 1868.

3837. G. Hadfield, of Lancaster, Varnish Manufacturer. Improvements in the manufacture of varnish. Dated 17th December, 1868.

3850. C. Liebermann and C. Graebe, of Berlin, Chemists. Improvements in preparing colouring matters. Dated 18th December, 1868.

3863. E. P. H. Vaughan, of Chancery-lane. Improvements in the manufacture of rosin oil. Dated 18th December, 1868.

3870. P. Spence, of Newton Heath, near Manchester, Manufacturing Chemist. Improvements in the manufacture of alum and aluminous salts. Dated 19th December, 1868.

3878. W. F. Stanley, of Great Turnstile, Holborn, Optician. Improvements in the construction of machines for exciting frictional electricity. Dated 21st December, 1868.

3893. W. E. Gedge, of Wellington-street, Strand. A novel bituminous composition. Dated 21st Dec., 1868.

3959. G. T. Bousfield, of Buxton. Improvements in extracting the colouring matter of madder root from the ligneous matter of the plant. Dated 29th December, 1868.

9. F. Perry, of Fenchurch-street, Merchant. An improved process for preserving animal and vegetable substances from decay, and also for preserving fermented liquors. Dated 1st January, 1869.

98. C. J. Günther, of 43, Mark-lane. Improvements in salting and preserving meat. Dated 13th Jan., 1869.

375. C. D. J. Seitz, of Bury, Lancaster, Manufacturing Chemist. Improvements in the construction of furnaces and pans for the recovery of the soda from the waste lyes resulting from the boiling of esparto grass, straw, or other fibrous substances in the working and incinerating of the residue resulting from evaporation. Dated 6th Feb., 1869.

600. J. Townsend, of Glasgow, Manufacturing Chemist. Improvements in extracting and in refining oils and other products from mineral and other materials containing carbon and hydrogen, and in apparatus therefor. Dated 26th February, 1869.

875. A. Clark, of Chancery-lane. Improvements in machinery for rubbing and mixing paints, chemicals, fertilizers, and other substances. Dated 22nd March, 1869.

1178. G. T. Bousfield, of Brixton. Improvements in the manufacture of heavy hydrocarbon oils, and in apparatus used therein. Dated 16th April, 1869.

1310. H. A. Bonneville, of Paris. A new and improved means of concentrating the caloric of heated water used for bathing purposes. Dated 28th April, 1869.

Patents which have become void:—

1520. T. J. Smith, of Whitechapel, Engineer. An improved apparatus to be employed in drawing liquids from casks and other vessels. Dated 31st May, 1866.

1546. M. C. Rogers, M.R.C.S., of 18, New Burlington-street. Improvements in the method of, and apparatus for, fitting artificial teeth, and retaining them in position. Dated 4th June, 1866.

1573. W. E. Newton, of Chancery-lane. Improvements in jars for preserving fruits, meats, and other substances. Dated 7th June, 1866.

1593. S. Lees, of Salford, Lancaster, Manufacturing Chemist. Improvements in furnaces for consuming petroleum and other hydrocarbons. Dated 12th June, 1866.

1633. W. B. Brown, of Manchester. An improved antiacid oil. Dated 16th June, 1866.

1639. J. E. T. Woods, of Camberwell-grove, Civil Engineer. Improvements in the manufacture of pigments. Dated 18th June, 1866.

Specifications published during the month:—

1868. Postage 1d. extra.

3202. C. Lauenstein. Purifying and decolourising paraffin. 4d.

3232. C. Akrill. Burning creosote, &c. 4d.

3238. R. Dowling. Bottles for poisons. 4d.

3289. J. Wallace. Dental appliances. 6d.

3294. H. J. Sanders. Drawing liquids from two or more vessels simultaneously. 4d.

3323. R. Irvine. Producing alcoholic liquids. 4d.

3346. M. Samuelson. Corrugated plates for manufacturing oil cakes. 4d.

3352. M. Sautter. Preparing and preserving vegetable and animal substances. 4d.
3368. J. H. Johnson. Preparing pigments. 4d.
3404. L. A. Israel. Manufacturing sulphuric acid. 4d.
3484. A. McNiel and W. Wheaton. Manufacture of salts of ammonia from ammoniacal gas liquor. 4d.
3525. D. Burns. Compounds for treating venereal disease. 4d.
1869.
173. C. Baunscheidt. Instrument for treating rheumatism, &c. 6d.

Varia.

F. R. C. S.

We once received a circular of invitation to witness the half-yearly distribution of prizes at a country boarding school, and were surprised to gather from it, not only that the locality abounded in physicians, but that these physicians were interested either in the general work of education or in the prosperity of the particular establishment. The letters F.R.C.P., or at least M.R.C.P., were appended to the name of almost every gentleman who was announced to take any part in the proceedings. We learned in due time that these letters referred to the *"College of Preceptors"* instead of to the venerable institution now seated in Pall-mall, and could not but think that their employment might give a hint for a new picture of "Dignity and Impudence." Her Majesty, we learn, has been pleased to allow the Colonial Society to be distinguished by the title of "Royal"; and the Fellows propose for the future to place the letters F.R.C.S. after their names. It is too bad that the privileges of the College of Surgeons should be thus invaded; and it seems to be the plain duty of the Council to make such representations in the proper quarter that the infant Colonial Society may adopt distinctive initials in place of those which are already appropriated to the Fellows of an ancient corporation.—*Lancet.*

TRADE REPORT.

The commerce of the country at the present time, if not remarkably active, cannot be regarded as languid. In most departments of trade a fair share of business seems in hand, and from the stock-market downwards a satisfactory and healthy tone pervades commercial transactions. The close or commencement of a half-year is generally considered a time favourable for buying; but in foreign produce, at least, large stocks await any demand, and, in consequence, prices show in general a slightly downward tendency.

Chemicals are decidedly dull. Cream of Tartar and Tartaric Acid are a little cheaper, Citric maintaining former quotations. Bleaching Powder is very low and dull of sale, 9s. to 9s. 3d. being the latest quotations. Roll Brimstone is quiet, at 11s. to 11s. 6d. Saltpetre has still further declined, and is difficult to sell; large arrivals of this salt are reported from Bengal. There is at present no Bombay Saltpetre on the market. British refined is quoted at 25s. to 26s. From 20s. to 25s. may be regarded as the "peace" price of this variable product. Iodide of Potassium is higher. Iodine is firm. Soda and salts thereof are declining. Quinine is firm, but no advance is reported, though in some instances the alkaloid barks have realized rather higher figures. The present quotation for British Quinine is 5s. 9d.; French, 5s. 2d. Mercurials, and all other Chemicals, are unchanged in price.

Drugs.—Camphor has slightly declined in price, and is likely to retrograde still further. The stock nearly doubles that of last year, and large quantities are reported afloat The speculations in Camphor, which have been rather extensive here, but more so in New York, have, we apprehend, proved in most instances unremunerative. Castor Oil, as we have anticipated by the reports from India, is cheaper, for all qualities, 6s. being now the very extreme price. The stock is larger than it has been for several years. Opium, too, is much lower, the present value for Turkey varying from 26s. to 30s. The quality offered for sale, however, has not been of the highest. There is a good demand for best Rhubarb, and quality in this would obtain good prices, but it is not forthcoming. The best Ginger is "wanted" likewise, and the same remark applies to Tinnevelly Senna. Of the three last-named drugs we have a superabundant stock of inferior parcels, but only good sells well. Calumba Root is held firmly for 50s. China and Galangal are scarce. Ipecacuanha is cheaper, and both East and West India Tamarinds have been sold at a considerable reduction, the greater part being damaged, or of very poor quality. Aloes: Cape arrive freely, but meet a ready sale at low prices, and at auction the greater part of the stock offered has found buyers. Socotrine, on the contrary, except for finest samples, is almost unsaleable. There is a good demand for all descriptions of Isinglass, and prices are rather higher. Buchu Leaves, if short and broad, sell readily, but the long leaves find no buyers. Oils of Aniseed and Cassia are declining; the stock of both is large, and fresh arrivals are reported. In Gums, Ammoniacum, Manilla Copal, Dammar, Myrrh, and Olibanum are chiefly in demand. Considerable business has been done in all of these. Assafœtida is rising, and a larger supply is much wanted. Gum Arabic, too, though rather easier, still sells freely. Extract of Henbane has advanced to 8s., this extraordinary rise being due to the scarcity of leaves, which will probably not be remedied for some months. Rose Leaves, too, are in very short supply, and will be dearer. Balsam of Capivi is lower.

Oils are in several instances dearer. Olive is 1*l.* per tun higher than last month for similar qualities. Linseed is very firm, and Rapeseed Oil has advanced nearly 3*l.* per tun. Refined Petroleum is cheaper, and Turpentine is slow of sale.

Drysaltery.—Indigo is now held firmly, the latest reports from India respecting the new crop being considered unsatisfactory, in consequence of the drought which has prevailed in many districts. Galls are dull of sale, but prices are fairly maintained. Safflower is likely to be much higher, as there is a considerable demand, a low stock, and no prospect of large arrivals. Turmeric has receded to former rates. Red Sanders Wood is in demand, and prices are better. Cutch is dull, but Gambier sells fairly. Cochineal is a little lower.

The following is a statement of the imports of the various Dyes for the for the first five months of the years

	1867.	1868.	1869.
Dyes and Dyeing Stuffs:—			
Brazil Wood tons	282	253	1,949
Cochineal ... cwts.	10,970	7,425	9,631
Indigo...	30,263	23,705	39,351
Logwood ... tons	10,575	9,179	11,994
Madder and Madder Root ... cwts	99,461	146,671	65,021
Garancine	22,828	40,416	10,551
Shumac ... tons	4,034	3,504	3,822
Gambier	4,870	7,107	7,046
Cutch	274	399	338
Valonia	6,595	10,874	9,307

The following important report is from Kingston (Jamaica):—

Logwood is still scarce and wanted. There is enough to cut to supply immediate wants, but future supplies can only be obtained at higher prices, the wood having to be brought from some distance in the interior. It is impossible to make contracts just now for future delivery, contractors having still to complete their former engagements. The shipments both to America and Europe have been recently upon a very limited scale, consequent upon the scarcity of the article and the absence of tonnage. Freights having advanced at St. Thomas and neighbouring ports, orders for vessels have not been supplied. Our previous remarks in regard to logwood still apply. It is out of the power of this island, with its limited population, bad roads, and insufficient animal power, to draw logwood from the interior as fast as it is likely to be required. Prices in Europe must continue to advance, in order to induce shipments from this island to any extent. The continued troubles of Hayti point to the time when the scarcity of logwood in Europe and in America will be so great that even much higher rates than at present prevail there will fail to procure sufficient from this island for a moiety of their requirements.

Fustic is not so much inquired for, and very little of this wood is now being exported.

Monthly Price Current.

[The prices quoted in the following list are those actually obtained in Mincing lane for articles sold in bulk. Our Retail Subscribers must not expect to purchase at these market prices, but they may draw from them useful conclusions respecting the prices at which articles are offered by the Wholesale Firms.]

CHEMICALS.	1869. May				1868. May			
ACIDS—	s.	d.	to	s. d.	s.	d.	to	s. d.
Acetic .....per lb.	0	4	..	0 0	0	4	..	0 0
Citric .....per lb.	2	7	..	0 0	2	6	..	2 7
Nitric ..... ,,	0	5	..	0 5½	0	5	..	0 5½
Oxalic ..... ,,	0	7½	..	0 8	0	8	..	0 0
Sulphuric ..... ,,	0	0½	..	0 1	0	0½	..	0 1
Tartaric crystal .. ,,	1	2½	..	0 0	1	3	..	0 0
powdered ,,	1	3	..	1 3½	1	3½	..	0 0
ANTIMONY ore.....per ton	280	0	..	300 0	280	0	..	0 0
crude ..per cwt	26	0	..	0 0	23	0	..	0 0
regulus.. ,,	50	0	..	0 0	43	0	..	0 0
star .... ,,	50	0	..	0 0	43	0	..	0 0
ARSENIC, lump..... ,,	16	0	..	16 6	16	0	..	16 6
powder.... ,,	7	3	..	7 6	7	6	..	8 0
BRIMSTONE, rough ..per ton	165	0	..	0 0	132	6	..	135 0
roll ....per cwt	11	0	..	11 6	10	3	..	11 0
flour.... ,,	13	0	..	13 6	14	0	..	14 6
IODINE, dry .....per oz.	0	9½	..	0 10	0	9½	..	0 10
IVORY BLACK, dry...per cwt.	0	0	..	0 0	0	0	..	0 0
MAGNESIA, calcined ..per lb.	1	6	..	1 8	1	6	..	1 8
MERCURY..... per bottle	137	0	..	138 0	137	6	..	0 0
MINIUM, red .....per cwt.	20	9	..	21 0	21	0	..	22 0
orange .... ,,	31	6	..	32 6	33	6	..	0 0
PRECIPITATE, red ....per lb.	2	6	..	0 0	2	6	..	0 0
white .. ,,	2	5	..	0 0	2	5	..	0 0
PRUSSIAN BLUE ..... ,,	0	0	..	0 0	1	0	..	1 10
SALTS—								
Alum .....per ton	145	0	..	150 0	150	0	..	155 0
powder .... ,,	165	0	..	170 0	170	0	..	175 0
Ammonia:								
Carbonate .....per lb.	0	5½	..	0 6	0	5	..	0 5½
Hydrochlorate, crude, white.....per ton	460	0	..	540 0	420	0	..	500 0
British (*see* Sal Ammoniac)								
Sulphate ....per ton	325	0	..	0 0	280	0	..	290 0
Argol, Cape .....per cwt	65	0	..	80 6	65	0	..	75 0
France .... ,,	45	0	..	60 0	48	0	..	70 0
Oporto, red ,,	23	0	..	25 0	25	0	..	28 0
Sicily .... ,,	40	0	..	45 0	50	0	..	55 0
Naples, white ,,	55	0	..	65 0	60	0	..	70 0
Florence, white	70	0	..	75 0	75	0	..	80 0
,, red ,,	60	0	..	65 0	65	0	..	70 0
Bologna, white ,,	0	0	..	0 0	78	0	..	80 0
Ashes (*see* Potash and Soda)								
Bleaching powd..per cwt.	9	0	..	9 3	11	0	..	11 3
Borax, crude .... ,,	25	0	..	40 0	25	0	..	35 0
(Tincal) .. ,,	45	0	..	60 0	30	0	..	50 0
British refnd. ,,	68	0	..	70 0	50	0	..	52 6
Calomel .....per lb.	2	5	..	0 0	2	5	..	0 0
Copper:								
Sulphate .....per cwt.	23	6	..	24 0	24	6	..	25 0
Copperas, green ..per ton	52	6	..	60 0	55	0	..	60 0
CorrosiveSublimate..p.lb.	1	11	..	0 0	1	11	..	0 0
Cr. Tartar, French, p. cwt.	84	0	..	85 0	84	0	..	85 0
Venetian grey ,,	0	0	..	0 0	0	0	..	0 0
brown ,,	65	0	..	75 0	67	6	..	70 0
Epsom Salts ....per cwt.	8	0	..	8 6	8	0	..	9 0
Glauber Salts .... ,,	5	6	..	6 0	5	6	..	6 0
Lime:								
Acetate, white, per cwt.	12	6	..	23 0	13	0	..	21 6
Magnesia:								
Carbonate..... ,,	42	6	..	0 0	42	6	..	0 0
Potash:								
Bichromate ....per lb.	0	5	..	0 5½	0	5	..	0 0
Carbonate:								
Potashes, Canada, 1st sort .....per cwt.	31	0	..	0 0	31	0	..	31 6
Pearlashes, Canada, 1st sort .....per cwt.	32	0	..	0 0	33	0	..	33 6
Chlorate .....per lb.	0	11½	..	0 0	1	2	..	0 0
Prussiate .....per lb.	0	11½	..	0 0	1	0	..	1 1
red..... ,,	1	9½	..	1 10	1	9½	..	1 10
Tartrate (*see* Argol and Cream of Tartar)								
Potassium:								
Chloride .....per cwt.	7	10	..	8 0	8	3	..	8 6
Iodide..... per lb.	12	0	..	0 0	12	0	..	0 0
Quinine:								
Sulphate, British, in bottles ..... per oz.	5	9	..	0 0	4	9	..	0 0
Sulphate, French ...	5	1	..	5 2	4	4	..	4 8
Sal Acetos .....per lb.	0	10	..	0 10½	0	10	..	0 0
Sal Ammoniac, Brit. cwt.	36	0	..	38 0	33	0	..	35 0
Saltpetre:								
Bengal, 6 per cent. or under .....per cwt.	20	0	..	20 6	19	3	..	19 6
Bengal, over 6 per cent. per cwt.	19	0	..	19 9	18	9	..	19 0
Madras..... ,,	18	0	..	19 0	17	6	..	18 6
Bomb & Kurrachee p.ct.	0	0	to	0 0	18	0	to	18 0
European..... ,,	0	0	..	0 0	21	6	..	22 6
British, refined ,,	25	0	..	26 0	28	0	..	23 6
Soda: Bicarbonate, p.cwt.	10	0	..	10 9	12	0	..	12 3
Carbonate:								
Soda Ash ....per deg.	0	1¾	..	0 0	0	2	..	0 2½
Soda Crystals per ton.	77	6	..	0 0	87	6	..	0 0

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Soda:	s.	d.		s. d.	s.	d.		s. d.
Hyposulphite..per cwt.	18	0	..	0 0	16	0	..	18 0
Nitrate ..... ,,	16	0	..	17 0	11	0	..	12 6
SUGAR OF LEAD, White, cwt.	41	0	..	42 0	37	6	..	38 0
Brown ..... ,,	29	0	..	30 0	27	0	..	28 0
SULPHUR (*see* Brimstone								
VERDIGRIS ..... per lb.	1	0	..	1 2	0	11	..	1 0
VERMILION, English..per lb.	2	6	..	3 0	2	6	..	3 0
China.... ,,	2	7	..	0 0	3	0	..	0 0
DRUGS.								
ALOES, Hepatic....per cwt.	80	0	..	180 0	100	0	..	160 0
Socotrine .. ,,	120	0	..	300 0	130	0	..	300 0
Cape, good.. ,,	28	0	..	32 0	30	0	..	32 0
Inferior ,,	16	0	..	27 0	18	0	..	29 0
Barbadoes ,,	80	0	..	200 0	75	0	..	210 0
AMBERGRIS, grey ....per oz.	27	6	..	32 6	32	6	..	36 0
BALSAMS—								
Canada ..... per lb.	1	3	..	0 0	1	5	..	0 0
Capivi ..... ,,	1	0	..	1 11	1	8½	..	1 9
Peru ..... ,,	11	0	..	11 6	9	0	..	9 3
Tolu ..... ,,	2	3	..	0 0	2	6	..	0 0
BARKS—								
Canella alba ....per cwt.	30	0	..	45 0	30	0	..	38 0
Cascarilla..... ,,	26	0	..	36 0	23	0	..	35 0
Peru, crown & grey per lb.	0	10	..	2 3	0	10	..	1 10
Calisaya, flat ,,	3	2	..	3 6	2	6	..	2 8
quill ,,	3	2	..	3 6	2	2	..	2 8
Carthagena ,,	0	0	..	1 6	0	9	..	1 3
Pitayo ,,	0	6	..	1 5	0	8	..	1 3
Red..... ,,	3	0	..	9 0	1	6	..	6 0
Bucho Leaves ..... ,,	0	3½	..	0 7	0	2½	..	0 9
CAMPHOR, China.. per cwt.	97	6	..	100 0	130	0	..	132 6
Japan ,,	107	6	..	0 0	130	0	..	132 6
Refin Eng. per lb.	1	6	..	0 0	1	9	..	0 0
CANTHARIDES ..... ,,	2	8	..	2 9	2	2	..	2 3
CHAMOMILE FLOWERS p. cwt	50	0	..	60 0	45	0	..	80 0
CASTOREUM ..... per lb.	4	0	..	32 0	5	0	..	32 3
DRAGON'S BLOOD, reed p. ct.	100	0	..	160 0	100	0	..	200 0
lump ,,	100	0	..	200 0	100	0	..	240 0
FRUITS AND SEEDS (*see also* Seeds *and* Spices)								
Anise, China Star pr cwt.	110	0	..	115 0	85	0	..	90 0
German, &c. ,,	26	0	..	38 0	36	0	..	41 0
Beans, Tonquin .. per lb.	1	0	..	1 6	1	2	..	1 6
Cardamoms, Malabar								
good ,,	7	9	..	8 2	7	9	..	8 9
inferior ,,	5	0	..	7 0	5	3	..	7 0
Madras ,,	4	6	..	8 0	4	9	..	8 6
Ceylon ,,	2	6	..	3 3	2	6	..	3 9
Corozo Nuts.... per cwt.	16	0	..	19 0	12	0	..	19 6
Cassia Fistula.. ,,	30	0	..	35 0	14	0	..	28 0
Castor Seed .. ,,	11	0	..	13 0	11	0	..	12 0
Cocculus Indicus ,,	25	0	..	0 0	30	0	..	35 0
Colocynth, apple.. per lb.	0	5	..	0 9	0	7	..	1 1
Croton Seeds .. per cwt.	60	0	..	65 0	75	0	..	85 0
Cubebs ..... ,,	36	0	..	40 0	40	0	..	45 0
Cummin..... ,,	65	0	..	70 0	21	0	..	28 0
Dividivi ..... ,,	10	6	..	12 6	10	6	..	12 6
Fenugreek..... ,,	9	0	..	14 0	11	0	..	12 0
Guinea Grains .. ,,	38	0	..	39 0	43	0	..	44 0
Juniper Berries ,,	7	0	..	8 0	9	0	..	10 0
Myrobalans ,,	9	6	..	16 0	14	0	..	19 0
Nux Vomica.... ,,	11	0	..	15 0	14	0	..	16 0
Tamarinds, East India ,,	12	0	..	26 0	24	0	..	32 0
West India, new ,,	12	0	..	22 0	24	0	..	34 0
Vanilla, long ..... per lb.	21	0	..	28 0	9	0	..	14 0
inferior ,,	12	0	..	20 0	3	0	..	8 0
Wormseed per cwt.	25	0	..	30 0	1	6	..	0 0
GINGER, Prescived, in bond (duty 1d. per lb.) per lb.	0	6	..	0 9	0	8	..	0 10
GUMS (*see separate List*)								
HONEY, Narbonne ,,	0	0	..	0 0	0	0	..	0 0
Cuba .... ,,	21	0	..	36 0	27	0	..	36 0
Jamaica.. ,,	25	0	..	45 0	25	0	..	46 0
IPECACUANHA .... ,,	5	8	..	0 0	6	6	..	6 8
ISINGLASS, Russian .. ,,	2	6	..	4 6	2	2	..	4 0
Tongue sort ,,	3	1	..	5 1	3	2	..	4 5
East India ,,	2	3	..	4 4	2	0	..	4 0
West India ,,	4	0	..	4 4	3	5	..	3 9
Russ. long staple ,,	8	0	..	0 0	9	0	..	10 0
,, leaf ,,	5	0	..	8 0	5	6	..	8 6
,, Simovia ,,	1	6	..	2 6	1	6	..	2 6
JALAP, good ..... ,,	3	2	..	4 0	3	9	..	4 6
Infer. & stems ,,	0	6	..	3 0	0	9	..	3 10
LEMON JUICE .. per degree	0	0	..	0 1½	0	0½	..	0 1
LIQUORICE, Spanish per cwt.	68	0	..	68 0	65	0	..	70 0
Italian ,,	48	0	..	67 0	50	0	..	60 0
MANNA, flaky .... ,,	4	6	..	5 0	3	0	..	3 6
small..... per lb.	2	0	..	2 6	1	6	..	1 9
MUSK..... per oz.	19	0	..	35 0	19	0	..	40 0
OILS (*see also separate List*)								
Almond, expressed per lb.	1	3	..	0 0	1	7	..	0 0
Castor, 1st pale .... ,,	0	5½	..	0 5½	0	5½	..	0 6
second .... ,,	0	4½	..	0 5	0	5	..	0 5½
infer. & dark ,,	0	4½	..	0 5	0	4½	..	0 0
Bombay (in casks)	0	4½	..	0 0	0	4½	..	0 0
Cod Liver .....per gall.	5	0	..	7 0	4	6	..	7 0
Croton.....per oz.	0	3	..	0 4	1	2	..	1 6
Essential Oils:								
Almond .....per lb.	40	0	..	0 0	38	0	..	0 0
Anise-seed .....per lb	8	6	..	9 0	8	3	..	8 6
Bay .....per cwt.	65	0	..	70 0	75	0	..	0 0
Bergamot .....per lb.	9	0	..	16 0	12	0	..	0 0
Cajeput, (in bond) per oz.	0	1¾	..	0 2	0	2	..	0 0
Caraway .....per lb.	5	3	..	5 9	5	0	..	6 9
Cassia ..... ,,	4	10	..	5 0	5	9	..	6 0
Cinnamon .....per oz.	1	0	..	4 6	1	0	..	3 6

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Essential Oils, *continued:*—	s.	d.		s.	d.	
Cinnamon-leaf ..per oz.	0	6	..	0	0	
Citronelle ..... ,,	0	2½	..	0	0	3
fine.... ,,	0	3½	..	0	0	
Clove.....per lb.	2	8	..	0	0	
Juniper ..... ,,	1	9	..	2	0	
Lavender..... ,,	3	0	..	4	0	
Lemon..... ,,	4	6	..	7	0	
Lemongrass ....per oz.	0	4½	..	0	0	
Neroli ..... ,,	0	0	..	0	0	
Nutmeg ..... ,,	0	4	..	0	8	
Orange.....per lb.	5	0	..	7	0	
Otto of Roses....per oz.	14	0	..	21	0	
Peppermint:						
American ....per lb.	19	0	..	19	6	
English ..... ,,	34	0	..	44	0	
Rosemary ..... ,,	1	9	..	2	0	
Sassafras..... ,,	4	0	..	5	0	
Spearmint ..... ,,	4	0	..	18	0	
Thyme..... ,,	1	10	..	4	0	
Mace, expressed .. per oz.	0	1	..	0	2½	
Opium, Turkey ..... per lb.	26	0	..	30	0	
inferior ..... ,,	16	0	..	24	0	
Quassia(bitter wood) per ton	170	0	..	0	0	
Rhubarb, China, good and fine .....per lb.	4	6	..	9	3	
Good, mid. to ord. ,,	0	8	..	4	0	
Dutch trimmed ,,	10	0	..	0	0	
Russian ..... ,,	0	0	..	0	0	
Roots—Calumba..per cwt.	40	0	..	50	0	
China ..... ,,	27	0	..	35	0	
Galangal ..... ,,	15	0	..	20	0	
Gentian ..... ,,	19	0	..	20	0	
Hellebore ..... ,,	22	0	..	30	0	
Orris..... ,,	38	0	..	44	0	
Pellitory ..... ,,	58	0	..	60	0	
Pink.....,,per lb.	0	7	..	0	10	
Rhatany..... ,,	0	5	..	0	10	
Senega..... ,,	1	0	..	0	0	
Snake ..... ,,	1	3	..	0	0	
Saffron, Spanish .. ,,	26	0	..	34	0	
Salep .....per cwt.	110	0	..	120	0	
Sarsaparilla, Lima per lb.	0	7	..	0	8	
Para..... ,,	1	0	..	1	3	
Honduras..... ,,	1	0	..	1	6	
Jamaica ..... ,,	1	8	..	2	6	
Sassafras .....per cwt.	13	0	..	14	0	
Scammony, Virgin ..per lb.	28	0	..	34	0	
second & ordinary ,,	10	0	..	22	0	
Senna, Bombay ..... ,,	0	5	..	0	5½	
Tiunivelly ..... ,,	0	2½	..	0	11	
Alexandria..... ,,	0	10	..	1	8	
Spermaceti,refined.. ,,	1	5	..	1	6	
American ..... ,,	1	5	..	0	0	
Squill..... ,,	0	1	..	0	2½	
GUMS.						
Ammoniaci drop ..per cwt.	200	0	..	230	0	
lump .. ,,	120	0	..	200	0	
Animi, fine washed ,,	280	0	..	320	0	
bold scraped ,,	200	0	..	280	0	
sorts ..... ,,	100	0	..	190	0	
dark ..... ,,	80	0	..	110	0	
Arabic, E. I., fine pale picked .... ,,	80	0	..	84	0	
srts, gd. to fin ,,	70	0	..	78	0	
garblings.. ,,	45	0	..	65	0	
Turkey, pick. gd to fin. ,,	170	0	..	230	0	
second & inf. ,,	90	0	..	160	0	
in sorts .. ,,	70	0	..	110	0	
Geddа.... ,,	38	0	..	45	0	
Barbary, white ,,	83	0	..	85	0	
brown .. ,,	70	0	..	75	0	
Australian ..... ,,	25	0	..	45	0	
Assafetida, com. to gd ,,	60	0	..	110	0	
Benjamin, 1st qual. ,,	280	0	..	500	0	
2nd ,, ,,	140	0	..	220	0	
3rd ,, ,,	51	0	..	120	0	
Copal, Angola red ,,	100	0	..	105	0	
Benguela .. ,,	100	0	..	110	0	
Sierra Leone..per lb.	0	5	..	1	4	
Manilla ..per cwt.	23	0	..	50	0	
Dammar, pale .... ,,	95	0	..	105	0	
Euphorbium ..... ,,	15	0	..	16	0	
Galbanum ..... ,,	220	0	..	250	0	
Gamboge,pckd pipe ,,	240	0	..	300	0	
Guaiacum .....per lb.	0	0	..	1	4	
Kino.....per cwt.	60	0	..	120	0	
Kowrie,rough.... ,,	46	0	..	60	0	
scraped .. ,,	65	0	..	110	0	
Mastic, picked.....per lb.	5	0	..	5	6	
Myrrh, gd. & fine per cwt.	200	0	..	260	0	
sorts..... ,,	90	0	..	170	0	
Olibanum, p. sorts ,,	80	0	..	85	0	
amber & ylw. ,,	70	0	..	79	0	
garblings .... ,,	25	0	..	45	0	
Senegal .....per cwt.	75	0	..	80	0	
Sandarac ..... ,,	80	0	..	100	0	
Thus..... ,,	13	0	..	14	0	
Tragacanth, leaf.. ,,	240	0	..	380	0	
in sorts ,,	120	0	..	230	0	
OILS.						
Seal, pale.....per tun	£39	6	..	0	0	
yellow to tinged ,,	34	0	..	37	0	
brown..... ,,	31	0	..	32	0	
Sperm, body ..... ,,	92	0	..	0	0	
headmatter ,,	0	0	..	0	0	

Oils, *continued:*—	1869. £	s.		1868. £	s.	
Cod..... ,,	44	0	..	45	0	
Whale, South Sea, pale ,,	40	0	..	41	0	
yellow ,,	39	0	..	40	6	
brown ,,	37	0	..	0	0	
East India, Fish ,,	32	0	..	0	0	
Olive, Galipoli ..... ,,	53	0	..	0	0	
Trieste ..... ,,	52	0	..	0	0	
Levant ..... ,,	47	10	..	48	0	
Mogador..... ,,	47	0	..	0	0	
Spanish ..... ,,	50	0	..	51	0	
Sicily ..... ,,	49	0	..	0	0	
Cocoanut, Cochin.. per ton	45	0	..	0	0	
Ceylon.. ,,	43	0	..	0	0	
Sydney ,,	38	0	..	43	0	
Ground Nut and Gingelly :						
Bombay ..... ,,	0	0	..	0	0	
Madras..... ,,	40	0	..	41	0	
Palm, fine ..... ,,	41	0	..	0	0	
Linseed ..... ,,	32	0	..	0	0	
Rapeseed, English, pale .. ,,	41	10	..	0	0	
brown..... ,,	37	10	..	0	0	
Foreign pale... ,,	42	0	..	43	0	
brown..... ,,	40	0	..	0	0	
Cottonseed ..... ,,	27	10	..	33	0	
Lard..... ,,	72	0	..	75	0	
Tallow ..... ,,	35	0	..	37	6	
Turpentine, American, oks. ,,	28	0	..	0	0	
Petroleum, Crude ..... ,,	14	0	..	15	0	
	s.	d.		s.	d.	
refined, per gall.	1	6	..	1	6½	
Spirit ,,	0	10	..	0	11	
SEEDS.	s.	d.		s.	d.	
Canary .....per qr.	58	0	..	68	0	
Caraway, English per cwt.	42	0	..	50	0	
German, &c.... ,,	34	0	..	44	0	
Coriander ..... ,,	20	0	..	22	0	
Hemp .....per qr.	0	0	..	0	0	
Linseed, English per qr...	0	0	..	0	0	
Black Sea & Azof	58	0	..	0	0	
Calcutta ,,	61	6	..	0	0	
Bombay ,,	62	0	..	0	0	
St. Petrsbrg. ,,	57	0	..	57	6	
Mustard, brown..per bshl.	14	0	..	17	0	
white... ,,	13	0	..	18	0	
Poppy, East India per qr,	58	0	..	0	0	
SPICES.						
Cassia Lignea ....per cwt.	124	0	..	132	0	
Vera ..... ,,	45	0	..	90	0	
Buds ..... ,,	140	0	..	160	0	
Cinnamon, Ceylon,						
1st quality ....per lb.	2	0	..	3	7	
2nd do. ..... ,,	1	9	..	3	5	
3rd do. ..... ,,	1	4	..	3	2	
Tellicherry ..... ,,	2	5	..	2	9	
Cloves, Penang..... ,,	0	10	..	0	11½	
Amboyna..... ,,	0	5	..	0	6	
Zanzibar ..... ,,	0	4	..	0	4½	
Ginger, Jam , fine per cwt.	90	0	..	200	0	
Ord. to good .. ,,	35	0	..	80	0	
African..... ,,	24	0	..	25	0	
Bengal ..... ,,	30	0	..	0	0	
Malabar ..... ,,	0	0	..	0	0	
Cochin ..... ,,	32	0	..	120	0	
Pepper, Bl. Malabar, per lb.	0	5	..	0	5½	
White, Tellicherry ,,	0	10	..	1	6	
Cayenne ..... ,,	0	4	..	0	8½	
Mace, 1st quality ..per lb.	2	9	..	3	6	
2nd and inferior.. ,,	1	10	..	2	6	
Nutmegs, 78 to 60 to lb.	2	3	..	4	2	
90 to 80 ,,	1	10	..	2	2	
132 to 95 ,,	1	5	..	1	9	
VARIOUS PRODUCTS.						
COCHINEAL—						
Honduras, black ..per lb.	3	0	..	4	0	
,, silver .. ,,	2	7	..	3	3	
,, pasty .. ,,	1	6	..	2	6	
Mexican, black .... ,,	3	0	..	3	3	
,, silver.... ,,	2	9	..	3	0	
Teneriffe, black.... ,,	3	0	..	4	3	
,, silver.... ,,	2	9	..	3	1	
PUMICE STONE ..per ton	120	0	..	160	0	
SOAP, Castile ....per cwt.	37	0	..	0	0	
SPONGE, Turk. fin pkd pr lb.	12	0	..	15	0	
Fair to good .. ,,	5	0	..	11	0	
Ordinary .. ,,	0	0	..	4	0	
Bahama..... ,,	0	6	..	2	3	
TERRA JAPONICA—						
Gambier .. per cwt.	17	0	..	17	6	
Free cubes ,,	19	6	..	23	0	
Cutch ..... ,,	25	6	..	26	6	
WOOD, Dye, Bar ..per ton	£4	0	..	£4	15	
Brazil ..... ,,	0	0	..	0	0	
Braziletto ..... ,,	0	0	..	0	0	
Cam..... ,,	26	0	..	32	0	
Fustic, Cuba..... ,,	7	15	..	8	10	
Jamaica ..... ,,	5	5	..	7	0	
Savanilla..... ,,	0	0	..	0	0	
Logwood, Campeachy ,,	10	0	..	10	10	
Honduras ..... ,,	6	10	..	0	0	
St. Domingo .... ,,	6	0	..	6	10	
Jamaica ..... ,,	7	5	..	7	10	
Lima, first pile.... ,,	14	0	..	15	0	
Red Sanders..... ,,	7	5	..	7	7	
Sapan, Bimas, &c. ,,	8	0	..	11	0	

circular explaining the arrangements made for the reception of visitors, together with a map of the south-west counties, indicating the various places and objects of general and scientific interest. We are reminded by the circular that the population of the city is about 42,000; that there is no lack of hotels and private lodgings in the city; and that the neighbouring watering places, Exmouth, Dawlish, and Teignmouth, have ample accommodation for visitors and their families. Furthermore, we learn that invitations have been received by the local committee from the inhabitants of Plymouth, Devonport, Torquay, and Taunton, for the members of the Association to visit those places; and that it is expected that excursions will be made to North Devon and Dartmoor. To pharmacists the sixth annual meeting of the British Pharmaceutical Conference will prove even more attractive than the meeting of the parent association. Now that the rocks and shoals of legislation have been left behind, the good ship "Conference," with Mr. DANIEL HANBURY at the helm, cannot fail to make steady progress on the track of pharmaceutic science, and as there are no signs of foul weather, the crew may look forward to a merry time. The meeting will be opened on the morning of Tuesday, the 17th of August, but, as the secretaries have not yet issued their circular, we cannot give full details of the arrangements until our next number appears. We understand that many important papers are promised, and that the local committee are actively engaged in making arrangements for the meeting.

ACCORDING to the *British Medical Journal*, the Legislature of the State of New York have passed an Act forbidding anyone employed in pharmacy to prepare a medical prescription unless he has served two years' apprenticeship in a drug-store, or is a graduate of a medical college or of a college of pharmacy. Violation of the Act is punishable as a misdemeanour, by a fine not exceeding 100 dollars, or imprisonment not exceeding six months; and, in case of death occurring as a consequence of such violation, the offender is to be deemed guilty of felony, and be fined not less than 1,000 nor more than 5,000 dollars, or to be imprisoned in the State Prison for not less than two years nor more than four years, or to be both fined and imprisoned at the discretion of the court.

WE learn from the same journal that one of the Barbier Prizes of the French Academy has been awarded to Dr. THOMAS R. FRASER, Assistant Professor of Materia Medica in the University of Edinburgh, for his well-known and elaborate researches on the Calabar bean. It is only a few months since that Dr. FRASER and Professor CRUM BROWN jointly received the Macdougal-Brisbane Prize of the Royal Society of Edinburgh for a valuable paper on the connection between the physiological action and chemical constitution of bodies.

A PHARMACEUTICAL Congress of all nations is to be held in Vienna in September. We trust that the Pharmaceutical Society of Great Britain will be well represented.

A CORRESPONDENT of the *Lancet* states that he was recently called to a case of lead palsy, in which the source of the lead was in vain sought for, until it was ascertained that the custom of the patient, a publican, had been for years to take each morning a glass of ale, which was always first drawn out of the engine, and which had been in contact with the leaden pipe for some time.

IN the new Austrian Pharmacopœia the grain and ounce weights have been abandoned, and the decimal system (grammes, centigrammes, and milligrammes) adopted. A commission has been appointed by the Minister of the Interior to bring this change into general use. A commission of physicians and apothecaries has also been formed to settle the prices of the substances newly introduced into the Pharmacopœia.

THE Homœopathic Society of France have decided that an hospital shall be founded in Paris in which the practice of homœopathy shall have free scope. A public subscription is to defray the expenses.

THE revised edition of the Danish Pharmacopœia (*Pharmacopœia Danica*) has lately been published.

AT the competitive examination held in June for the prizes in botany, annually given to medical students by the Society of Apothecaries, the successful candidates were:—1. EBENEZER GEER RUSSELL, Guy's Hospital, gold medal; 2. ALEXANDER WYNTER BLYTH, King's College, silver medal and book.

THE last of the "separate examinations for chemists and druggists in business" will be held on the 27th of August, as announced in the Pharmaceutical Society's advertisement. Any reader who wishes to take advantage of this final opportunity must apply to the secretary before the end of the present month.

THE annual *conversazione* of the Society of Arts took place on Thursday, the 1st inst., at the South Kensington Museum, when about 4,400 members and their friends were present. The company was received by Lord HENRY G. LENNOX, M.P., chairman of the council. The bands of the Grenadier Guards and of the Chatham division of the Royal Marines attended, and performed selections of music during the evening.

DR. JOHN BULL, a patent medicine manufacturer in Kentucky, has made a return to the inland revenue officers of the United States, showing that his net income for 1868 was 160,225 dollars.

THE Council of the Society of Arts have awarded the Albert Medal to Baron LIEBIG, in recognition of the general importance of his chemical researches.

THE Royal Humane Society have issued the following hints:—"Avoid bathing within two hours after a meal. Avoid bathing when exhausted from fatigue or from any other cause. Avoid bathing when the body is cooling after perspiration; but bathe when the body is warm, provided no time is lost in getting into the water. Avoid chilling the body by sitting or standing naked on the banks or in boats after having been in the water. Avoid remaining too long in the water; leave the water immediately there is the slightest feeling of chilliness. Avoid bathing altogether in the open air if, after having been a short time in the water, there is a sense of chilliness, with numbness of the hands and feet. The vigorous and strong may bathe early in the morning on an empty stomach. The young, and those that are weak, had better bathe three hours after a meal—the best time for such is from two to three hours after breakfast. Those who are subject to attacks of giddiness and faintness, and those who suffer from palpitation and other sense of discomfort at the heart, should not bathe without first consulting their medical adviser."

Veterinary Notes.

BY W. HUNTING, M.R.C.V.S.

FITS IN DOGS.

MOST authors apply the term epileptic to the convulsions of dogs. With all due respect, I will state my belief that epilepsy is seldom if ever seen in these animals. Convulsions are most commonly met with in young dogs, and may generally be traced to some irritating cause, as worms in the intestines, or the natural changes in the teeth. They may occur in animals debilitated by an attack of distemper, and, it is said, in an otherwise healthy animal, without any apparent cause. Treatment is remedial and preventive. Whilst the fit is on, little can be done save to keep the animal in a quiet place, and prevent it injuring itself. If the fits are violent and occur quickly, a warm bath may be tried; but in ordinary cases it is inexpedient, as the hair gets wet, and cannot be dried without great excitement to the animal. I fancy more dogs die of the heroic treatment than the disease, from the cold douches, hot baths, and emetics. Let the fits quite pass before endeavouring to remove the cause, be it loose teeth or intestinal parasites. The effects of chloroform on the convulsion deserve a trial; but as yet I cannot speak from personal observation. To prevent the return of fits after removing any probable cause, the following pill may be given:—

Arsenic, 1 gr.
Ferri Sulph., 20 grs.
Ext. of Gentian, sufficient to form 15 pills.
One every day.
Order exercise, good food, and a dry house.

"GREASE" IN HORSES.

This expressive name is given to a skin disease affecting the legs. Heavy cart horses are most subject to it. The hind legs seem more prone to become "greasy" than the fore. Grease varies in degree, from a small spot covered with short broken hairs, representing merely a wet surface, to a state in which the leg up to near the hock is covered with red, painful granulations and a stinking discharge. The treatment of this disease is generally tedious, and often unsuccessful; this I believe to be owing to neglect in dressing, as much as the natural obstinacy of the affection. The restiveness of the animal, coupled with the offensive smell arising from a greasy leg, renders the duty of dressing so disagreeable as to insure neglect in all but the most patient of men. A dressing should possess the following properties, astringent, caustic, and disinfectant, as—

Ferri Sulph.,
Zinci do.,
Cupri do., } of each 1 lb.

Dissolve in a gallon of boiling water, and add
Carbolic acid 4 oz.

Should any swelling of the leg occur, stay the application for a day, and give a dose of physic; the animal should be kept at work save during the first two or three dressings, as then in bad cases the pain is considerable. As a last resort, firing may be had recourse to; but as this entails at least two months' idleness, only a valuable horse is worth it.

FEVER.

Simple fever occurs as a symptom of other disorders; it accompanies inflammation of internal organs, and follows severe injuries; frequently, however, it appears as a primary affection, without any local disorder. It is customary to speak of catarrhal, gastric, and bilious fevers. Now, these are merely case of simple fever, with a local complication. They are not specific cases—the fever is the same in all. In one case, however, there is a local derangement of the air tubes; in another, of the digestive apparatus, not as the cause, but as the effect of the fever.

Under the name of influenza, fever is frequently met with in the horse. Cases are generally caused by cold, run a definite course, and terminate in a quick return to health. In fever we have increased heat, a rapid pulse and breathing, with arrested excretion and secretion. In the first stages there is an irregularity in the circulation; this is as far as a number of cases ever get, as a good stimulant and a little care produce a healthy reaction.

The ordinary stock "Fever Draughts" kept by horsemen are at this stage of the greatest value. Some contain sedatives, and some oil; the first are absolutely bad, and the latter unnecessary. A stimulant only is required; but as the same medicine is often employed throughout an attack, it may be as well to add a diuretic, as follows:—

Ether Sulph., 1½ oz.
Sp. Pimento, 3 oz.
Liq. Ammon. Acet. (conc.) 1½ oz.

A wineglassful when required, to be given in as much water; may be repeated in two or three hours if necessary. Care should be taken not to give an ordinary dose of aloes in violent fever, as super-purgation frequently results. Four ounces of linseed oil or sulphate of magnesia is preferable; or good effects may be relied on by giving carbonate of ammonia in two drachm doses twice a-day. The body should be well clothed; fresh air and cold water allowed *ad lib.* Green food and boiled barley and linseed is much better than a continuance of bean mashes, which only act as a laxative from being indigestible, and so do not support the system.

Abstracts of Foreign Papers.

ON THE ADMINISTRATION OF PROTOXIDE OF NITROGEN IN AQUEOUS SOLUTION.

M. STANISLAS LIMOUSIN publishes some remarks in the *Journal de Pharmacie et de Chimie* on the properties of protoxide of nitrogen, having reference to its administration in the form of solution. The author is not surprised that extremely diverse results should have been obtained by different operators, both in England and in France, when experimenting on the medicinal employment of gases at the time when these gases were first prepared in small quantities and with considerable difficulty, and when even their chemical and physical properties were not by any means thoroughly ascertained. The author is inclined to think that these experiments were made somewhat prematurely, and that, in reference to protoxide of nitrogen more particularly, the experiments on its inhalation have been made the subject of scientific curiosity rather than of medical inquiry. He is himself of opinion that a substance such as this, which combines remarkable anæsthetic properties with considerable oxidising powers, should in the state of solution be calculated to render eminent services to the cause of medicine.

M. Limousin finds by experiment that protoxide of nitrogen is soluble in an equal bulk of water, and does not require twice its bulk, as indicated by most chemical books. Therefore, a solution may be obtained at the ordinary atmospheric pressure of one volume of gas in one volume of water. Calculating from the fact that protoxide of